A MULTIVARIATE ANALYSIS OF FACTORS AFFECTING THE MANAGEMENT OUTCOME IN RHEGMATOGENOUS RETINAL DETACHMENT

Regional Institute of Ophthalmology &
Government Ophthalmic Hospital
Madras Medical College
Chennai

Dissertation submitted for

M.S.BRANCH III OPHTHALMOLOGY

THE TAMILNADU DR. M.G.R. MEDICAL UNIVERSITY
CHENNAI, INDIA

SEPTEMEBER 2006

CERTIFICATE

This is to certify that **Dr. Padma Priya. R, M.S.,** Post Graduate Student in Ophthalmology, Regional Institute of Ophthalmology, Govt. Ophthalmic Hospital, attached to Madras Medical College, Chennai, carried out this dissertation titled, **"A MULTIVARIATE ANALYSIS OF FACTORS AFFECTING THE MANAGEMENT OUTCOME IN RHEGMATOGENOUS RETINAL DETACHMENT"** by herself under my guidance and direct supervision during the period, July 2003 – September 2006. This dissertation is submitted to the Tamil nadu Dr. M.G.R. Medical University, Chennai in partial fulfillment of the award of M.S. Degree in Ophthalmology.

Prof. K. ASOKAN, M.S., D.O.,
Chief, Retina clinic,
Regional Institute of Ophthalmology
Govt. Ophthalmic Hospital
Egmore, Chennai – 600 008.

Prof. V. Velayutham, M.S.D.O.,
Director and Superintendent,
Regional Institute of Ophthalmology
Govt. Ophthalmic Hospital
Egmore, Chennai – 600 008.

PROF. DR.KALAVATHY PONNIRAIVAN, B.Sc, M.D
Dean
Chennai Medical College &
Government General Hospital,Chennai – 600 003.

ACKNOWLEDGEMENT

I am extremely grateful to **Prof. Kalavathy Ponniraivan, B.Sc., M.D., Dean, Madras Medical College,** Chennai for permitting me to conduct this study.

I am thankful to **Prof. V. Velayutham, M.S., D.O., Director, RIO & GOH,** for providing me with all the necessary facilities and to enable me to complete my study.

I express my sincere gratitude to **Prof. K. Asokan, M.S., D.O., Chief Retina clinic, RIO & GOH,** for his valuable guidance and constant encouragement through out my study.

I am grateful to my **Asst. Professors Dr. B. Eswar Raj, M.S., D.O.,** and **Dr. K. Rajasekar M.S.,** for their encouragement and for reviewing this work and offering valuable suggestions and remarks.

I thank all our Professors and Asst. Professors for their advice and suggestions throughout this study.

Finally, I am indebted to all the patients in this series without whose cooperation this study would not have been possible.

CONTENTS

	Page No.
PART I	
1. Introduction	**1**
2. Historical Review	**2**
3. Anatomy	**6**
4. Physiology of Retinal Apposition	**10**
5. Pathogenesis	**12**
6. Clinical Features	**25**
7. Differential Diagnosis	**28**
8. Management	**29**
PART II	
9. Objectives	**47**
10. Material and Methods	**48**
11. Observation	**52**
12. Discussion	**66**
13. Summary	**69**
14. Conclusion	**70**
PART III	
15. Proforma	
16. Master Chart	
17. Bibliography	
18. List of Surgeries	

INTRODUCTION

Retinal detachment is a condition in which fluid from the vitreous cavity passes through a full thickness retinal defect into the sub retinal space to cause separation of the neural retina from the underlying Retinal pigment epithelium

The term detachment of the retina is a misnomer. In the first place the retina as a whole is not involved, but a cleavage occurs between the two primitive retinal layers, the pigmentary epithelium remaining in position attached to the membrane of Bruch, while the inner neural layer becomes separated from it due to the opening of the potential space of the primary optic vesicle.

The condition of the RD is not a pathological entity but an anatomical accident. In the spontaneous variety, the detachment itself is essential catastrophe and the casual lesion may be so slight as to escape notice even after the most careful search. In the secondary variety, the RD is an incident epiphenomenon in a clinical picture dominated by a neoplasm, inflammation or other pathological features of obvious importance.

- Sir Stewart Duke elder

Over centuries the concepts and our approach towards retinal detachment has constantly changed a lot. An effort to trace it takes us through a journey into the evolution of modern ophthalmology itself.

HISTORICAL REVIEW

1740 - Morgagni described RD in a Ocular trauma case

1817 - Beer noticed but did not recognize RD is a Amaurotic cat's eye

1841 - Sichel & Desmarre's described signs of RD

1851 - Von Helmholtz reinvented the ophthalmoscope

1852 - Ruete invented the indirect ophthalmoscope

1853 - Coccius described retinal breaks

1857 - Arlt & Von Graefe proposed "Theory of distension" of Globe due to chroidal effusion and retinal breaks to indicate a healing process

1858 - Heinrich Muller proposed "Theory of traction"

1861 - Giraud teulon described the first indirect ophthalmoscope

1863 - Von Graefe successfully dissected a vitreous membrane with a needle

1869 - Iwanoff recognized, that vitreous detachment preceded RD

1870 - Dewecker & Jaeger opined that Retinal breaks caused Rd

1881 - Martin introduced thermocautery

1882 - De-Wecker used Galvanocautery to create aseptic chorioretinal adhesions but treatment was away from the retinal break.

1889 - De Wecker insisted that retinal breaks caused RD

1900 - Trantas used his thumb nail for scleral depression to examine the periphery with direct ophthalmoscope

1906 - Dufour revived Leber's theory that Retinal breaks caused RD

1911 - Ohm injected air into vitreous after SRF drainage

1918 to 1925 - Jules Gonin and his followers, Amsler, Arruga & Weve marked the Golden Era in the history of RD. the concepts that they proposed that retinal breaks produced RD and the attempts to close the Breaks through heat in the region of the hole were revolutionary.

As with any other Trendsetting Discoveries in science they were very badly received, as we can understand from the comment "The thought of piercing the eye with a red hot needle is barbaric".

1933 - Linder and Strampili described full thickness scleral resection and performed the first scleral buckling away from the retinal break.

1934 - Bietti described cryosurgery

1937 - Resongren used air in the vitreous and positioned patient to allow air to tamponade breaks.

1938 - Resengren used air in the vitreous and positioned patient to allow air to tamponade breaks.

1942 - Hruby described precorneal concave lens for fundus examination.

1947 - Schepens popularized and perfected the I/O and scleral depression

1953 - El Bayadi invented the Precorneal lens

1956 - Meyer Schwickerath invented xenon arc photocoagulation

1957 - Schepens introduced buckling with encirclage. Introduced silicon implants and RF diathermy

1957 - Goldmann invented the 3 mirror

1958 - Custodis used a plomb over retinal break and did not drain SRF

1959 - Schmidt provided the modern slit lamp

1960 - Maimen introduced first ruby laser

1962 - Cibis injected silicon oil into vitreous

1964 - Cooper revived cryosurgery

1964 - Zivojnovic repopularised silicone oil tamponade combined with vitreous surgery

1965 - Lincoff modified custodies technique

1967 - Rutunin described normal fundus periphery

1968 - Kasner showed that eyes tolerated well removal of vitreous

1970 - Freeman used air and a rotatable table to invert and tamponade flap of giant tear.

1971 - Robert Machemer introduced vitrectomy through VISC (vitreous infusion suction cutter). Devised open sky vitrectomy

1973 - Scott revived silicon oil injection into vitreous

1973 - Norton reported favourable results with SF6 injection with buckling and vitrectomy in complicated detachment

1978 - Machemer established role of RPE migration in cases of PVR

1979 - Lincoff and Usvi used temporary balloon buckle and sutured the retina in giant retinal tears

1980 - Hilton introduced pneumatic retinopexy

1980 - Lincoff tried perfluorocarbon gases

1981 - Hirose introduced open sky vitrectomy and retinal suturing in Giant tears.

1983 - Klotti introduced closed vitrectomy

1983 - "Retina society Terminology committee" replaced the terms MVR and MPP with PVR which was graded

1984 - Hilton and Drizzard introduced the term pneumatic retinopexy

1990 - Invention of BIOM – Binocular Indirect ophthalmomicroscopy.

ANATOMY

EMBRYOLOGY:

The Rudimentary eyeball develops as an ectodermal diverticulum from the lateral aspects of the forebrain, which grows laterally towards the side of the head.

The proximal portion becomes constricted to form the optic stalk & the distal portion becomes dilated to form the optic vesicle, which become invaginated to form the optic cup.

The cup & the stalk involutes during the 5^{th} week to produce a groove on their inferior aspect know as optic fissure. Vascular mesenchyma grows into the optic fissure and takes within the hyaloid artery. By 7^{th} week of embryonic development the fissure closes.

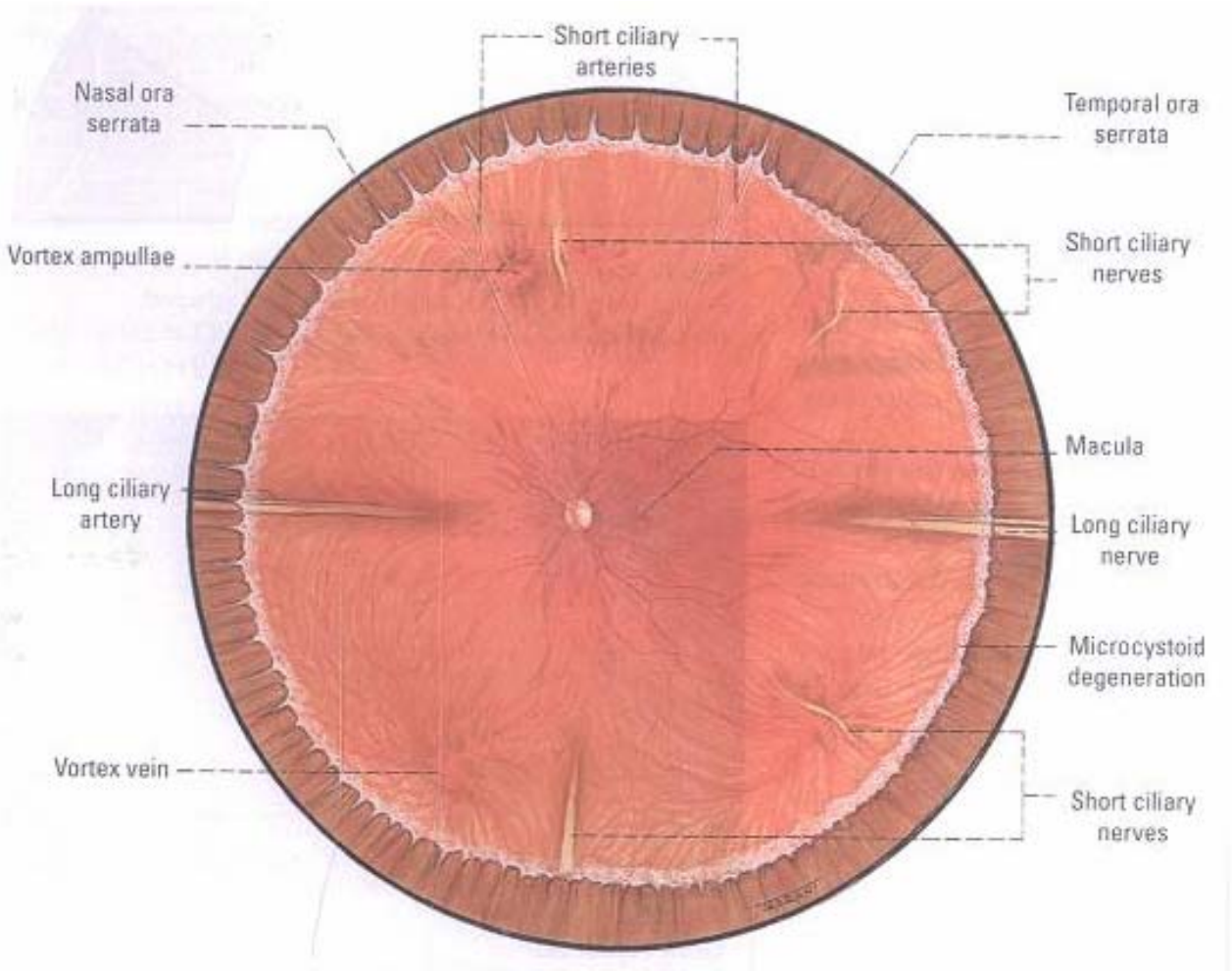
The pigment layer is formed from the outer thinner layer of optic cup. The neural layer is formed from the inner layer of optic cup. This is divided into outer nuclear & inner marginal zones. Cilia found in the outer nuclear zone disappear by 7^{th} week & replaced by rods & cones by 4^{th} month. The cells of the nuclear zone invade the marginal zone to form outer & inner neuroblastic layer. Outer layer forms Bipolor cells, horizontal cells. Inner layer forms muller cells, amacrane cells & ganglion cells. All layers are formed by the 8^{th} month of fetal life.

APPLIED SURGICAL ANATOMY

ORA SERRATA:

The ora serrata is the junction between the retina and ciliary body. The nasal ora is characterized by tooth-like extensions of retina onto the para plana (dentate processes) which are separated by oral bays. In the temporal ora the dentate processes are blunt or absent. Clinically insignificant congential lesions are small glistening ‘oral pearls’.

ANATOMICAL LANDMARKS



Visualization In the phakic eye the ora cannot be visualized without scleral indentation. In the aphakic eye visualization is possible without indentation, provided the pupil is large.

Surgical anatomy Externally the ora correspond to the insertions of the rectus muscles. Th the emmetropic eye this is located 7mm behind the limbus temporally and 6mm nasally.

PARS PLANA

The ciliary body is located 1 mm from the limbus and extends posteriorly for about 6 mm. The first 2 mm consists of the pars plicata and the remaining 4 mm consists of the flattened pars plana.

Surgical Anatomy In order not to endanger the lens or retina, the ideal location for surgical incisions is the mid-pars plana, which is located between 4 and 5 mm from the limbus.

VITREOUS BASE

The vitreous base is 3-4 mm wide zone that straddles the ora serrata.

Surgical Anatomy The collagen fibers of the vitreous are exceptionally dense and strongly adherent to the posterior pars plana and perioral retina. An incision through the mid-part of the pars plana (4-5 mm from the limbus) will usually be located anterior to the vitreous base.

VITREORETINAL ADHESIONS

Normal In the healthy eye the peripheral cortical vitreous is loosely attached to the ILM of the sensory retina. Stronger attachments occur at the following sites:

1. Vitreous base – very strong
2. optic disc margin – fairly strong
3. Around fovea – fairly weak
4. Peripheral blood vessels – usually weak

Abnormal Occasionally the following abnormally strong vitreoretinal adhesions are associated with retinal tear formation in eyes with acute PVD.

1. Posterior border of lattice degeneration
2. Congenital cystic retinal tufts.
3. Retinal pigment clumps
4. Peripheral blood vessels
5. Vitreous based anomalies - such as posterior tongue like extensions and isolated islands.
6. Areas of ‘white with pressure’ and ‘white without pressure’

LONG POSTERIOR CILIARY ARTERIES

Fundus landmarks The arteries accompanied by nerves are recognized as yellow lines that start behind the equator and run anteriorly in the 3 and 9 o’clock meridia. They divide the fundus into upper and lower zones.

Surgical anatomy The arteries run in the suprachoroidal space in line with the horizontal recti. Care should be taken not to damage them when draining SRF or performing intravitreal injections. Because the arteries supply the anterior uvea, obstruction to blood flow by a tight encircling band may result in anterior segment ischaemia.

VORTEX VEINS

Fundus landmarks The vortex ampullae are located just posterior to the equator in the 1, 5, 7, and 11 o'clock meridian.

Surgical anatomy Externally the vortex veins emerge from their scleral canals at variable distances from the equator. Not infrequently more than four vortex veins are present, and great care should be taken not to damage the veins when inserting a squint hook under the rectus muscles. The inferior vortex veins are at particular risk because they are usually located more anteriorly than the superior veins. Because the venous drainage of the anterior uvea is mainly via vortex system, occlusion of the veins by a posteriorly placed tight encircling strap will cause congestion of the anterior segment. The vortex veins limit posterior extension of a choroidal detachment as they pass through the suprachoroidal space into their scleral canals.

PHYSIOLOGY OF RETINAL APPOSITION

I. Forces inside sub-retinal space

- Adhesive force created by the acid muco polysaccharides in the vitreous gel that acts as a biological glue.
- Interdigitation of outer photoreceptors with numerous microvilli on the inner surface of RPE
- Ability of the RPE to remodel its apical segment in correspondence with the photo receptors

II. Forces outside sub-retinal space

- Oncotic pressure gradient caused by fluid movement across the sub-retinal space
- Hydraulic force of the IOP tends to flatten the retina against RPE
- Strong vitreo retinal adhesions (normal)
- Basement membrane of muller cell and vitreous cortex participate in the formation of internal limiting membrane of retina thus giving a support for retinal adhesion.

III. **Metabolic factors**

Active metabolic transport of fluid and ions by the RPE pump that keeps the sub-retinal space dry.

ALTERATION OF SUB-RETINAL FLUID PHYSIOLOGY IN RHEGMATOGEMOUS RD

RPE becomes more pleomorphic but cell borders remain distinct and becomes impermeable to large molecules.

SRF Source and Composition

SRF contains higher concentration of protein. There are 3 possible sources of SRF protein.

1. Plasma from chorio capillaries across RPE.
2. Vitreous from fluid movement through the break. This depends on the size of the hole and state of vitreous gel over the break.
3. From retinal degeneration elements

PATHOGENESIS

Rhegmatogenous Retinal Detachment affects about 1:10000 population each year and is bilateral in 10% of cases.

For Rheg RD to occur there must be a retinal break. These are caused by an interplay between vitreo retinal traction and an underlying weakness in the peripheral retina. The relative prevalence of retinal breaks in the general population suggest that there are still unknown factors associated.

FORMATION OF A BREAK

1. **Acute Rhegmatogenous PVD with collapse**

   Synchysis senilis due to alteration of the micro molecular structure of the vitreous causes liquefaction of the vitreous gel. This causes a hole in the posterior vitereous cortex. Synchitic fluid passes to the retro hyaloid space through the hole leading to posterior vitreous detachment. The remaining vitreous gel collapses and transmission of traction at sites of abnormally strong vitreo retinal adhesions leads to a retinal break.

   Vitreous traction may be exerted in different directions (perpendicular, tangential).

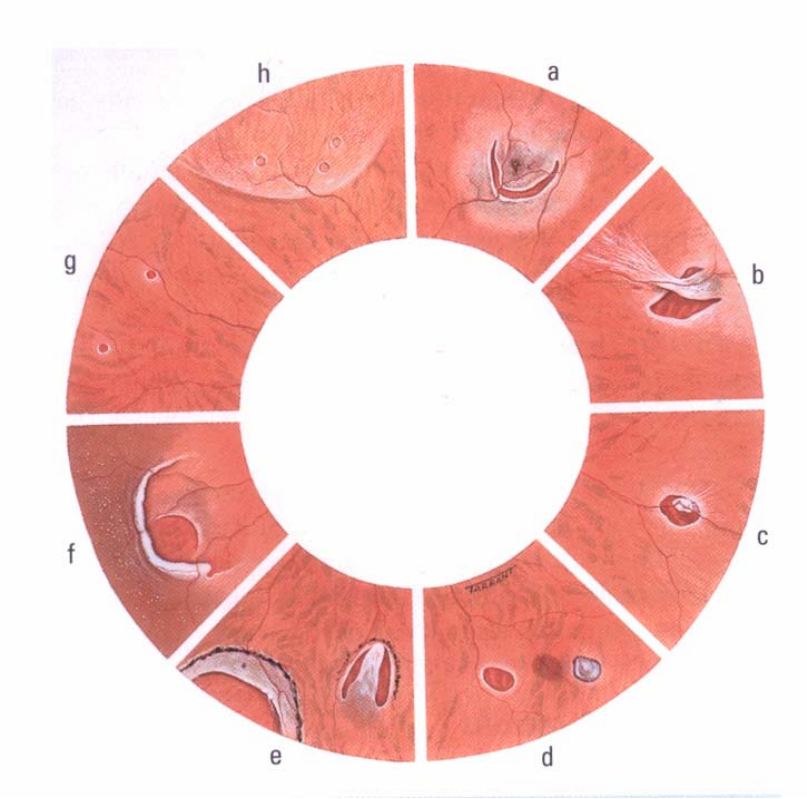
   Perpendicular traction

   PVD -> Vitreous pulled away from retina due to gravity -> traction perpendicular to the surface of the retina -> breaks at the sight of focal adhesions of the vitreous to the retina (if the force exerted by the vitreous on retina exceeds the adherence of the photo receptor to the RPE) e.g. HST in superior retina.

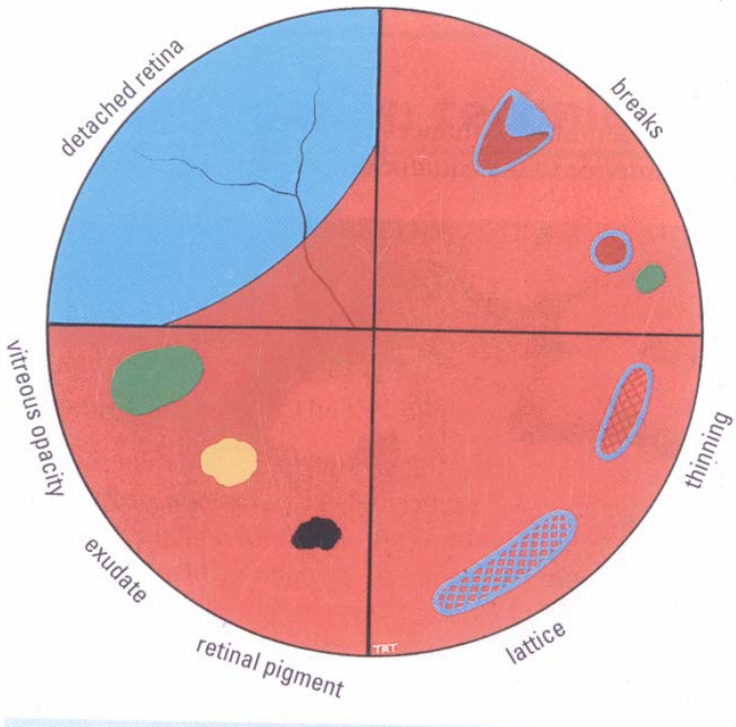
   Forces that cause traction on the retina

   a. Gravitational forces on the vitreous gel attached to the retina

VARIETY OF RETINAL BREAKS



COLOR CODE FOR RETINAL DRAWING



b. Inertial forces transmitted from vitreous to the retina during ocular movements and blunt trauma.
c. Contraction of the vitreous gel at sites of VR attachment caused by cellular proliferation
d. Contractile fibro cellular membrane on the surface of the retina posterior to a PVD.

2. **Localized vascular insufficiency leading to retinal atrophy and thinning forming a retinal hole.**

   About 60% of all breaks develop in areas of peripheral retinal that show specific changes e.g. lattice degeneration, snail track degeneration etc.. These lesions may be associated with spontaneous break down of pathologically thin retinal tissue to cause a retinal hole or they may predispose to retinal tear formation in eyes with acute PVD.

Types of Retinal break:

A retinal break is a full thickness defect in the sensory retina.

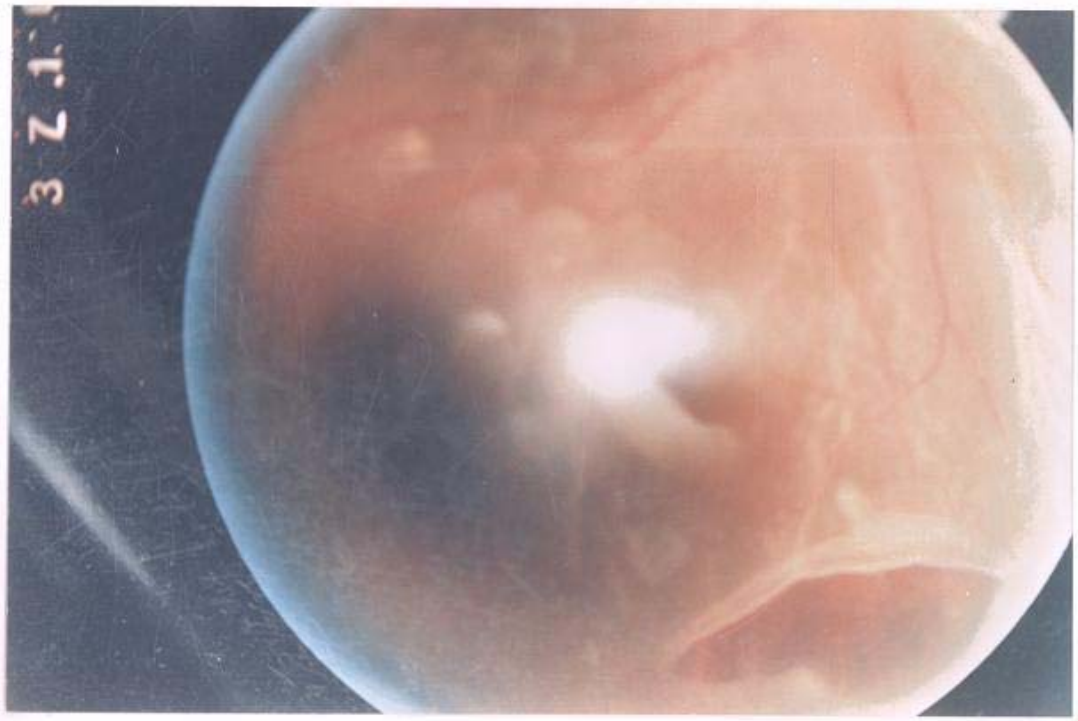
1. Round hole:

They have a punched out experience, occurs singly or in groups in an area of retinal degeneration or over a patch of chorioretinitis.

2. Horse shoe tears

The flap of the tear is attached to the retina at its base and the two posterior horns meets at the apex. The convexity of the tea is always turned towards the optic nerve and the concavity faces the ORA. The retinal tissue in the concavity form the operculum

3. Operculated tear



IRREGULAR TEAR

HORSE SHOE TEAR

Th

e flap is completely torn away and floats internally and anterior to the hole.

4. **Irregular tear**

   Same orgin as HST, usually in trauma

5. **Dialysis:**

   Circumferential retinal tears along oraserrata

6. **Giant Retinal tear**

   Involving 90 degree or more of the circumference of the globe

Frequency of various type of break

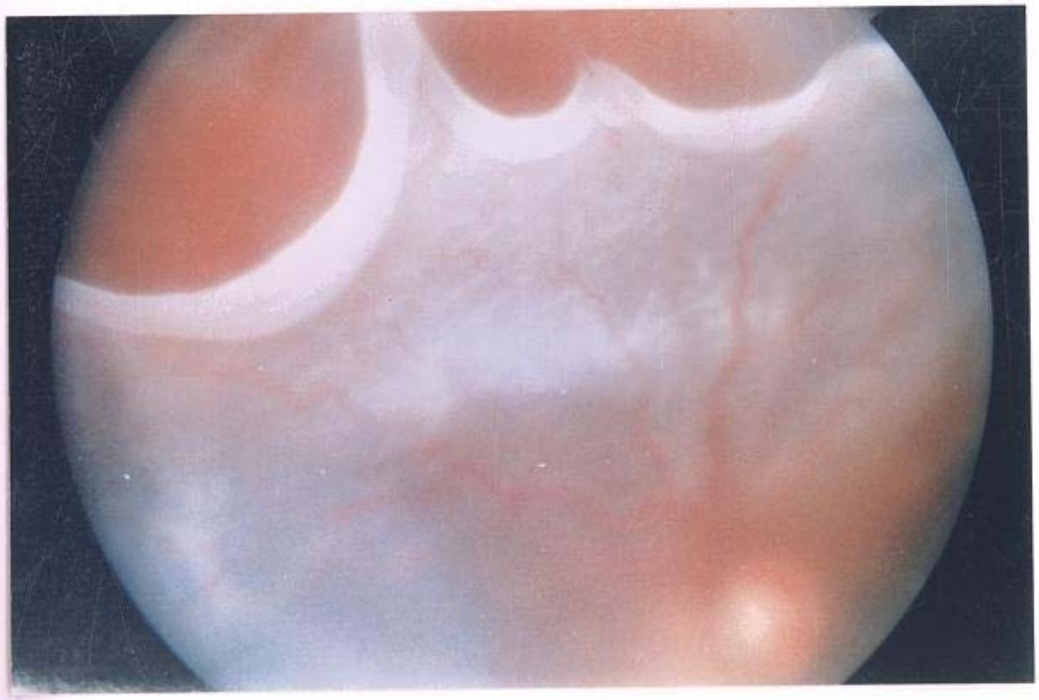
Type of break	Shapland (1932)	Tulloh (1965)
Round holes	34%	62%
HST	25%	27%
Dialyses	31%	5.5%

Quadrantic Distribution:

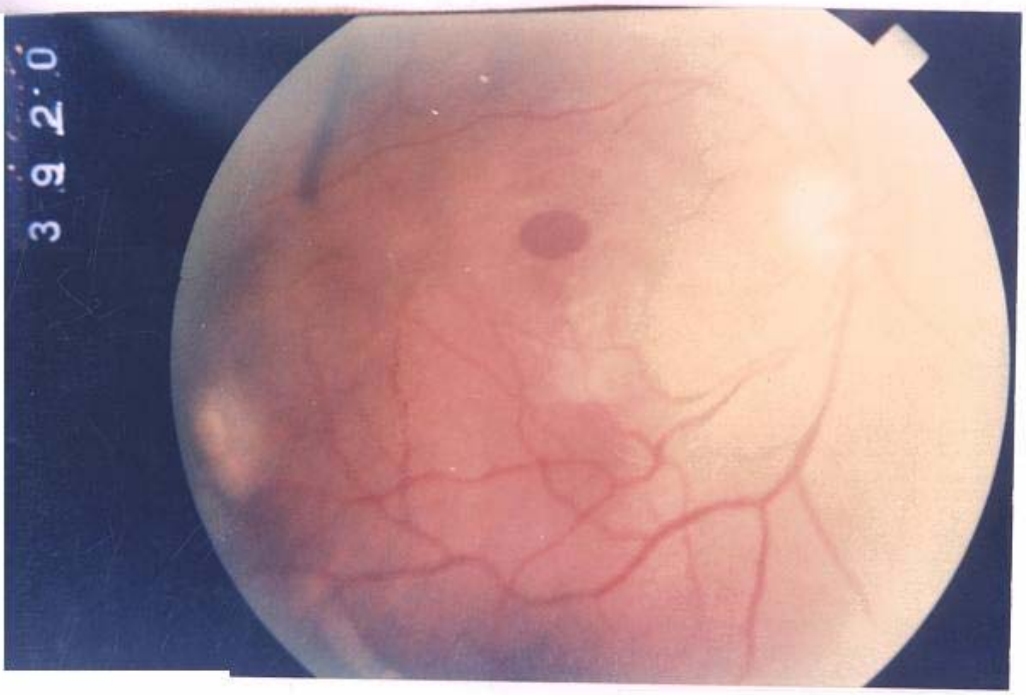
1. Supero temporal - Most common
2. Infero temporal
3. Upper nasal
4. lower nasal – least common

Radial distribution

1. Equatorial zone – 45%
2. Between equator and periphery – 27%



GIANT RETINAL TEAR



MACULAR HOLE

3. Periphery – 12%
4. Behind the equator – 15%
5. Macula – 1%

Site of predilection		
1.	Round hole	Temporal half especially upper quadrant in myope and lower quadrant in non myopes.
2.	HST	Upper half. Commonly temporal side with a predilection for the equator
3.	Dialysis	Lower temporal quadrant
4.	Linear tear	All quadrants. Rare in lower nasal

Multiplicity

50% of round holes are multiple holes because areas of retinal degeneration are rarely strictly localized.

RISK FACTORS FOR RHEGMATOGEMOUS RD

I. Hereditary/ Congenital/ Developmental/ Degenerative

- Male gender
- Hereditary vitreo retinopathy
- Myopia
- Lattice degeneration
- Cystic retinal tuft
- Degenerative retinoschisis
- Retinal breaks

II. Prior Ocular surgery

- Aphakia/ pseudophakia
- ND:YAG posterior capsulotomy
- Other surgery involving vitreous gel

III. Prior Ocular Trauma

IV. Inflammatory

- CMV retinitis
- Acute retinal necrosis

V. Fellow eye non-traumatic RD

PATHOGENESIS IN RELATION TO THE RISK FACTORS

1. Pathogenesis in post cataract RD

- Removal of lens causes loss in stabilizing grip on the vitreous body. All regions of vitreo retinal adherence both pathological and physiological experience a greater amount of torsional force for any given movement.
- Decrease in vitreous hyaluronan concentration due to loss of hyaluronic acid into the anterior chamber due to disruption of anterior vitreous face and absence of lens and posterior capsule.
- Loss of hyaluronic acid -> decrease in vitreous viscosity -> decrease in shock absorbing ability -> loss of vitreous lag and slack -> increase in vitreous currents -> increase forces transmitted to VR attachments during saccads and compromise of vitreous barrier to diffusion of internal fluid across the neural retina to the sub-retinal space.
- **Incidence of PVD (Mc Donnel et al):**
  - 84% in ICCE
  - 76% ECCE with PCR
  - 40% in ECC with internal capsule
- **Decrease in hyaluronic acid in vitreous:**
  - 63% in ICCE
  - 16% in ECCE

Pre-disposing factors for RD in cataract surgery
o Vitreous loss during surgery o Pre existing lattice degeneration o Myopia with axial length > 24.5 o Nd – Yag Capsulotomy o Post Operative trauma o PVD o H/O RD fellow eye o Family history of RD

- **Aphakic RD differ from pseudophakic RD in having**
  - Upper nasal breaks more common.
  - Typical breaks are U shaped tears located at the posterior border of the retinal breaks.
  - Lattice less common
  - Bi-lateral in 35% percent
  - Break not detected in 10% of cases
  - Total RD and macular involvement are more common – poor visual prognosis (Schepens et al., 1982)
  - Surgery more difficult because of poor visualization
- **Significant features in pseudo phakic RD**
  - Single posterior break is common

- Break not detected in 2% of cases
- Lattice more common
- 10% bilateral
- More RD within 1 year of surgery because they experience symptoms faster due to good vision
- Anatomical reattachment is comparable to aphakia

2. Pathogenesis after Yag capsulotomy

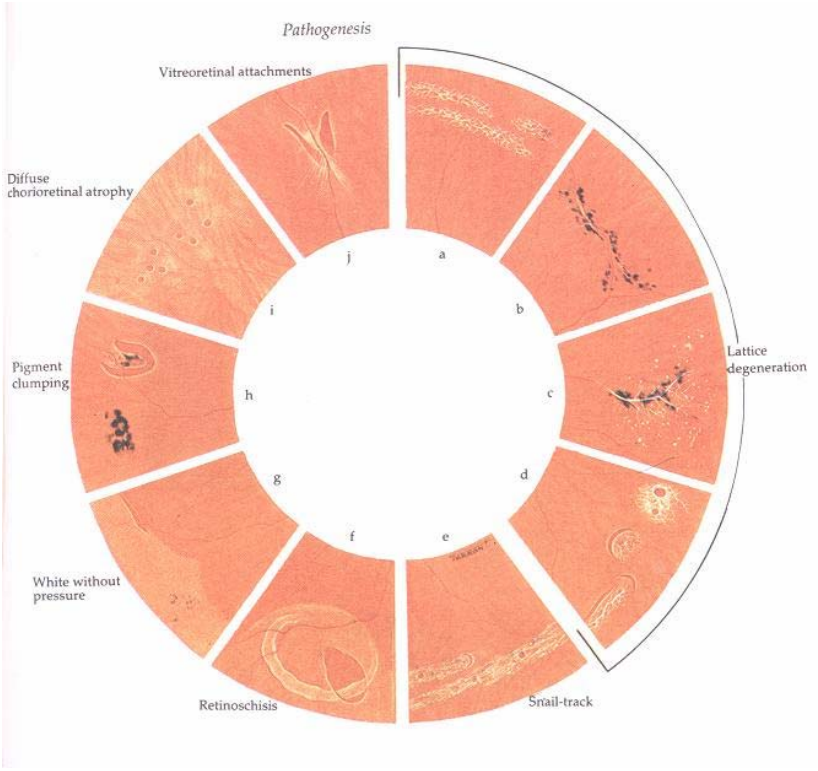
- Increased vitreous liquefaction due to de polymerization of hyaluronan and collagen due to laser vaporization
- Shock waves generated are detrimental
- Treatment should be delayed atleast 6 months after surgery

3. Pathogenesis in peripheral retinal degeneration

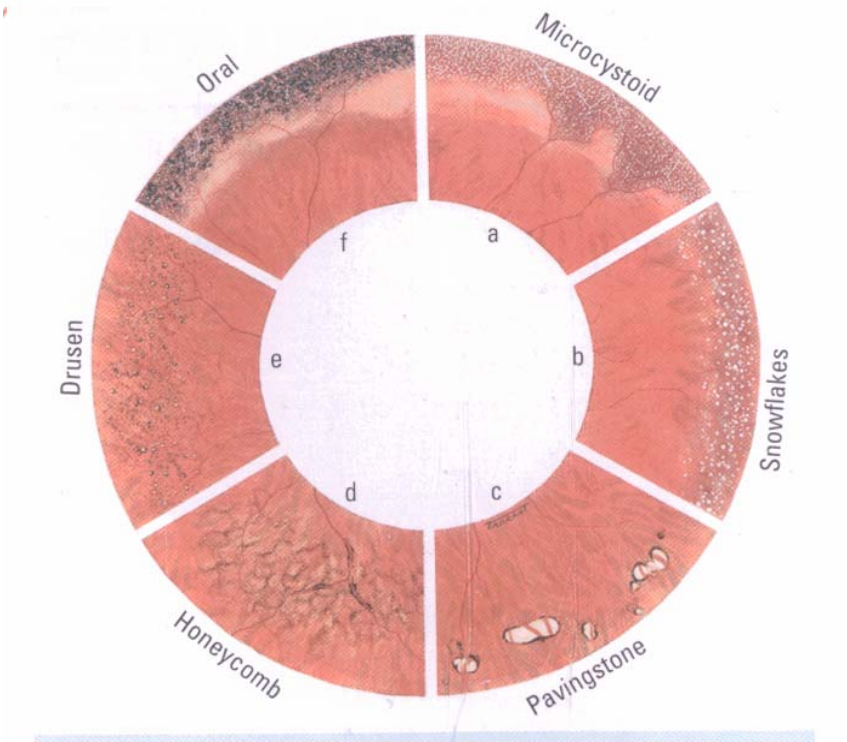
Predisposing peripheral degeneration
o Lattice degeneration o Snail track degeneration o Retinoschisis o White without pressure o Pigment clumping o Diffused chorioretinal atrophy

- These are sites of abnormal vitreo retinal adhesions leading to a retinal break due to dynamic vitreo retinal traction in eyes with acute PVD

PERIPHERAL DEGENERATIONS – SIGNIFICANT



PERIPHERAL DEGENERATIONS – INSIGNIFICANT



- **Lattice degeneration**
  - present in 8% of general population and 40% of eyes with RD
  - more common in myopes more than -3D
  - frequently found in patients with Marfan synd., stickler synd and Ehlers-Danlos syndrome
  - These are spindle shaped areas of retinal thinning circumferentially oriented and sharply demarcated
  - Located between the equator and posterior border of vitreous base
  - Usuall y bilateral usually located in the temporal half more frequently in the superior quadrant
  - Characteristic features of advanced lesion is an arborizing network of white lines continuous with peripheral blood vessel
- **Degenerative retinoschisis**
  - Incidence of RD 6%
  - Present in 5% of the population over the age of 20 yrs and more common in hypermetropes
  - Breaks more common in the **reticular type**
  - RD develop in eyes with break in both layers
- **White without pressure**
  - it is a translucent grey of retina which has a fixed configuration
  - it is present even with out scleral indendation
  - usually seen along the posterior border of lattice,snail track degeration and acquired retinoschisis.

- **Giant tears** occasionally develop along the posterior border of white with out pressure

- **Pigment clumps**
  - Occasionally found on the flap of a U shaped tear.

- **Diffuse chorioretinal atrophy**
  - Retinal holes develop in atrophic retina.

Indication for prophylactic treatment in degeneration
– **RD in fellow eye** – **Aphakia** – **High myopia** – **Family history of RD** – **Marfans ,Stickler or Ehler Danlos syndrome.**

Cryotherapy or laser photo coagulation is done depending on the site of lession.More anterior lesions treated with cryotherapy.

4. Pathogenesis in MYOPIA

Myopic eyes with long axial length have higher shearing forces on the retina with saccadic eye movements than the emmetropic eyes which may predispose to retinal tears.

Although, myopes constitute 10% of the general population over 40% of all RD's occur in myopic eyes. The higher the refractive error greater the risk.

Factors predisposing to RD in myopia
Lattice degeneration
Snail track degeneration
Diffuse chorio retinal atrophy
Macular holes
Vitreous degeneration & PVD
Vitreous loss during cataract surgery
Posterior capsulotomy

Myopic eyes may develop RD due to macular holes or giant tears both of which are difficult to seal.

5. Pathogenesis in Blunt trauma

Blunt trauma accounts for 70-85% of all traumatic RD & occurs mainly in young males. Although young patients have a higher incidence of eye injury than other age groups, they rarely develop acute RD because there vitreous has yet undergone syneresis therefore the vitreous provides an internal tamponade to the retina in spite of retinal tears or dialyses.

The clinical presentation of the RD is usually delayed as follows:

- 12% found immediately
- 30% within 1 month

- 50% within 8 months
- 80% within 24 months

RD in young patients may be shallow and often show signs of chronicity including multiple demarcations intra retinal cyst etc.

The initiating event in the pathogenesis of RD from blunt trauma ios the forceful anteroposterior compression of the globe which causes a lateral expansion of the equatorial area and tractional forces on vitreous breaks

- Retinal breaks may occur because of direct contusion and subsequent tissue necrosis or a result of vitero retinal traction following lateral equatorial expansion of the globe
- Traumatic syneresis of the vitreous gel overlying the retinal break which occur either immediately or months after blunt trauma. This liquefied vitreous may then dissect under the retinal break and cause RD

Most common type of break is retinal dialysis at the anterior border of vitreous base.

Other types of breaks:

- Macular hole
- HST on posterior margin of vitreous base
- HST at posterior end of meridonal fold
- HST at equator
- Operculated tear
- Dialysis at posterior border of vitreous base

Retinal dialysis

Present in 84% of the cases. Most common in superonasal quadrant, myopes are more susceptible and develop nasal dialysis and giant tears. Emmetropes typically develop infero temporal dialysis.

Traumatic macular hole

- Most common in injury with a ball.
- Mechanisms not clear probably due to post contusion necrosis, subfoveal hemorrhage, acute vitreoretinal traction as a result of contrecoup injury.
- Traumatic macular hole rarely leads to RD
- If RD occurs success rate is high

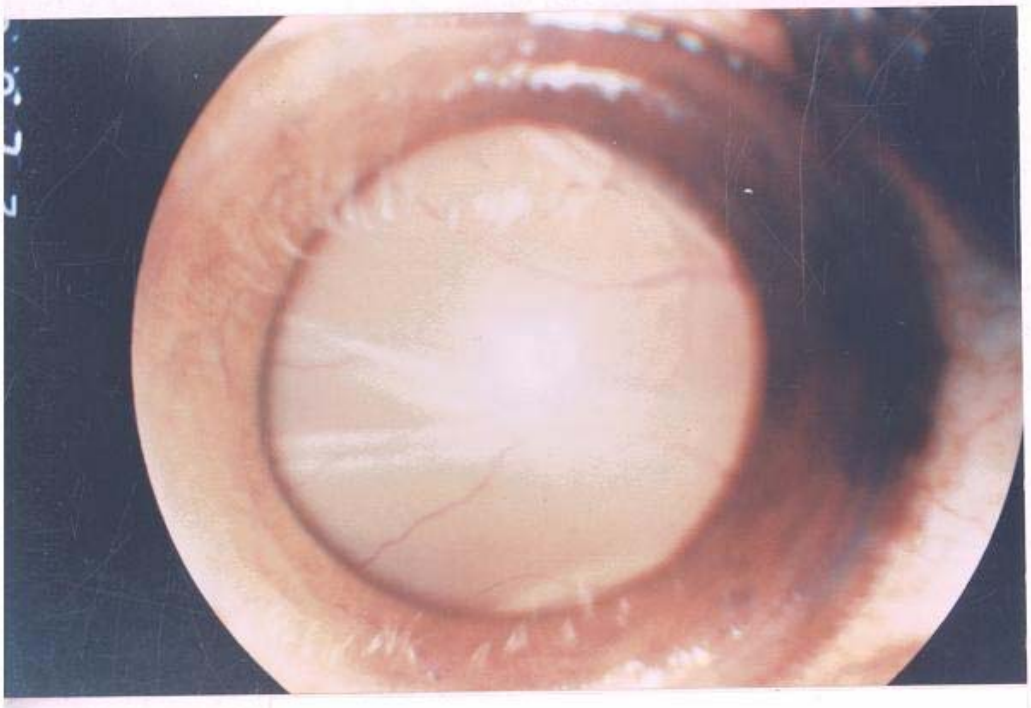
CLINICAL FEATURES

SYMPTOMS

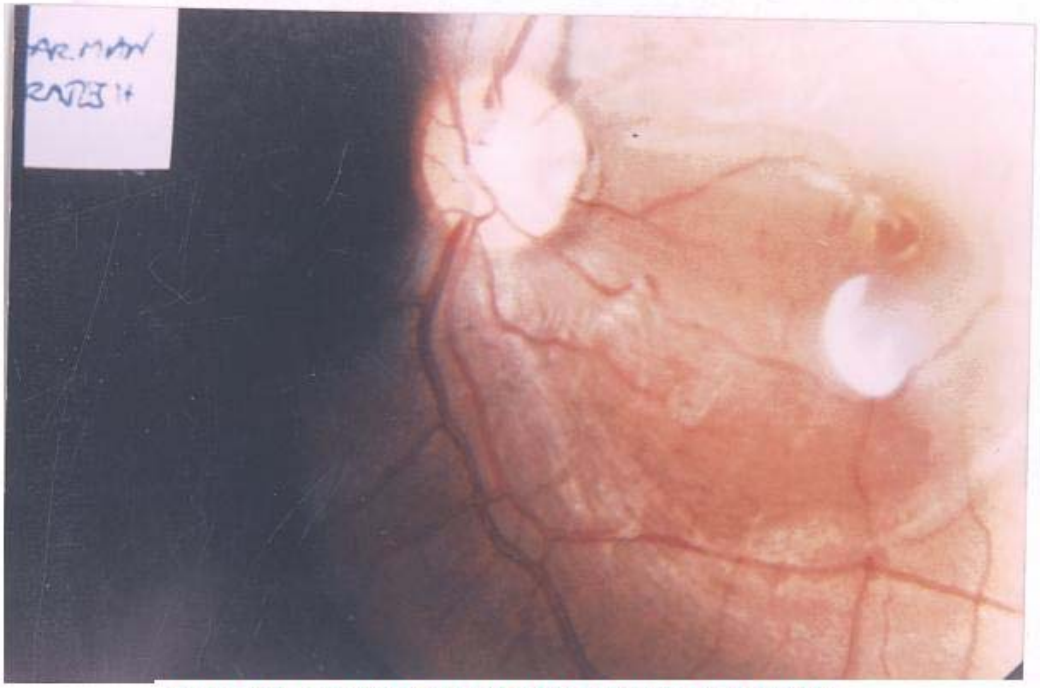
1. **Flashes (Photopsia)**: This dramatic symptom should warrant a complete fundus examination. It occurs due to traction at the abnormal sites of VR adhesion.
2. **Floaters (Muscae volitantes)** : Are moving vitreous opacities, which is perceived when it casts a shadow on the retina. Common in Myopes and may be like a large ring, Cobweb or small spots
3. **Field Defect :** Mainly detected when RD extends posterior to the equator due to spread of SRF perceived as "Black Curtain". Lower field defect is usually appreciated more quickly than the upper field defect.
4. **Failing Vision** : Failing slight is mainly due to SRF detaching the macula or by obstruction of the visual axis by a large bullous RD hanging over the fovea.
5. **Inverse Diplopia :** Especially seen in Giant tears and dialysis where the margin of the tear rolls over and inverts itself. The patient perceives a erect true image and inverted false image.

SIGNS

1. On external examination the eye appears normal
2. Visual acuity depends on the macula - it may be detached or covered by a overhanging bullous RD.
3. Visual field will show relative scotoma corresponding to the detached retina. There will be sloping edges.



TOTAL RD - ANTERIOR SEGMENT PHOTOGRAPH



MACULAR HOLE WITH DETACHMENT

4. Red reflex is altered and appears grey.
5. Pupillary reaction will either be normal or may be involved in extensive RD.
6. Mild anterior uveitis is a common finding. Server inflammation with posterior synechae is very rare.
7. IOP is most often decreased. The causes for decreased IOP are excessive synchytic vitreous leaving the Globe as SRF, drained by the RPE pump. RD with raised tension occurs in Blunt trauma, Tumour RD, Uveitis, obstruction of trab by inflammatory cells, pigment granules and photoreceptor segment (Schwartz syndrome).
8. Detached retina is convex, corrugated, grey with undulating movements. Retinal vessels appear dark and tortuous. Retinal breaks appear as discontinuities in the retinal surface. Breaks may be situated mainly in the periphery and mid periphery sometimes being hidden between folds.
9. Pigment cells in the Anterior vitreous is strongly suggestive of a retinal break appearing as Tobacco dusting (Shafer's sign).
10. The mobile posterior border of PVD may be observed (Weis reflex).

Signs of Old RD

1. Retinal thinning and atrophy is seen in long standing Rhegmatogenous retinal detachment.;
2. Sub retinal demarcation lines also called as high water marks are initially pigmented and subsequently tend to loose their pigment. These marks are at the junction of flat and detached retina and take 3 months to develop.
3. Secondary Intra retinal cysts take one year to develop.
4. The slow progress of proliferate vitreoretinopathy complicates the picture further.

PVR CLASSIFICATION 1983		
A	Minimal	Vitreous Haze, Vitreous Pigment clumps
B	Moderate	Wrinkling of inner surface, Rolled edge of break, retinal stiffness, vessel tortuosity
C	Marked	Full thickness retinal fold C1 One Quadrant C2 Two Quadrant C3 Three Quadrant
D	Massive	Fixed Retinal folds 4 Quadrants D1 Wide funnel D2 Narrow funnel D3 Closed funnel where ONH is hidden

PVR CLASSIFICATION 1991 (Retina society Terminology Committee)	
A	Vitreous haze, clumps, pigment clusters.
B	Wrinkling of inner surface, stiffness, tortuosity, rolled edges and decreased vitreous mobility
CP	1-12 post to equator, focal, diffuse, circumferential full thickness folds and subretinal strands.
CA	1-12 Antr to equator focal, diffuse, circumferential full thickness folds and subretinal strands. Antr displaced condensed vitreous strands.

DIFFERENTIAL DIAGNOSIS

1. Retinoschisis

In the Acquired variety there are two forms (a) Typical where the division in the neurosensory retina is at the level of outer plexiform layer (b) Reticular where the division is at the NFL. Acquired variety is seen in 5% of general population of which 70% are hypermetropes. Differentiating features are that schisis usually involves the inferior periphery of both fundi and extends circumferentially. The typical form stays antr to the equator although the reticular type may spread beyond the equator to threaten the macula. The inner layer has snowflakes and silver wire like vessels while the outer layer has beaten metal appearance and shows White with pressure. RD is a very rare complication because even though breaks may occur in the reticular variety they never communicate with the subretinal space.

Juvenile X linked retinoschisis is a congenital, X linked, recessive condition, where the neurosensory retina is split at the NFL. Almost all eyes are hypermetropic and have Cystoid foveal changes. In half of the cases schisis may be confined to fovea. In the other half foveal changes are accompanied by schisis in Inferotemporal quadrant.

2. Choroidal Detachment

Fluid collects in the suprachoroidal space and detaches the choroid in continuum with the ciliary body. The vortex veins as they bridge through may be a limiting factor as is the scleral spur at its gives attachment to the ciliary body.

MANAGEMENT

Preoperative

1. Careful history taking with relevance to symptoms of flashes or floaters, past H/o trauma, myopic status, diabetic status, H/o RD in other family members is very essential.
2. Complete examination of the Antr segment noting subtle features like tobacco dusting of Antr vitreous, Fine Iris new Vessels, Aphakic or pseudophakic status and state of post capsule is mandatory.
3. Recording of visual parameters like visual acuity, visual field, IOP, refractive status of the eye and papillary reaction should be done.
4. Detailed Posterior segment examination by all the possible modalities with diagrammatic representation in the funds chart is the first and foremost objective in managing RD case.

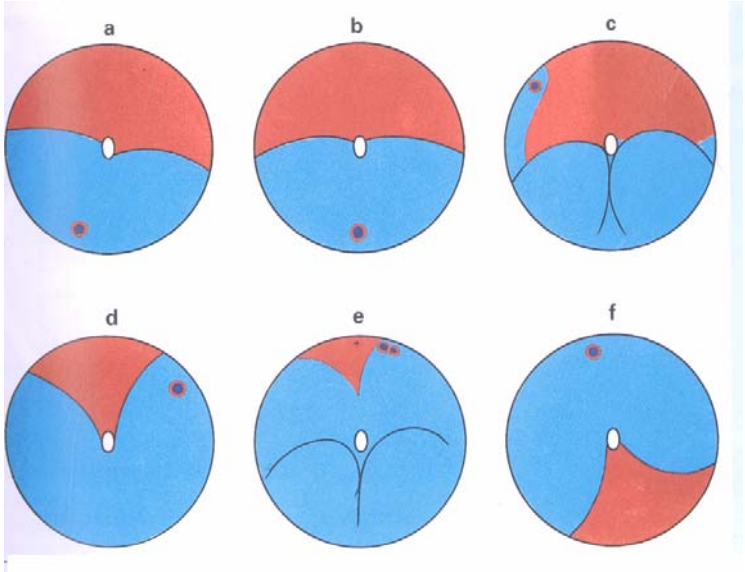
Direct Ophthalmoloscopy

Is not very useful as it fails to provide stereopsis and view of the periphery, which is very essential. It can be used for finer detail examination of the status of the posterior pole as it gives 15 times magnification, which is not possible with other modalities.

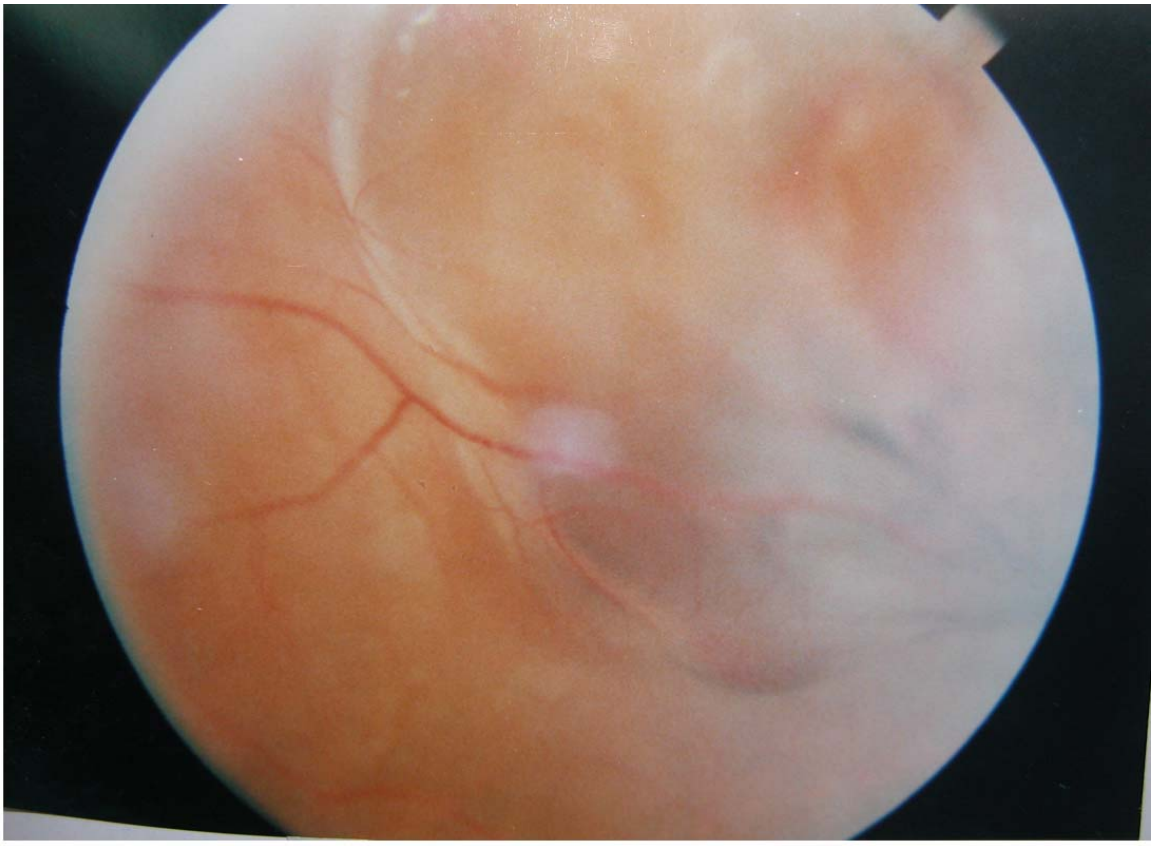
Indirect ophthalmoscopy

Under full mydrasis, is the most ideal method of examination. Stereopsis increased field of view and comfortable distance from the patient to draw the fundus diagram simultaneously are the advantages. The technique of scleral depression is essential to examine the ora serrata region and also to judge the nature of the tear. It should be done after topical

LINCOFF'S RULE FOR RETINAL BREAKS



BULLOUS DETACHMENT



anaesthesia, fully convincing the patient on the usefulness of the procedure and to bear with the discomfort. The depressor should always be held tangential to the globe.

To localize a break

Lincoff's rule may be used to identify the quadrant of possible break and detailed examination should be directed towards it. Indentation is essential to appreciate breaks in the periphery on profile. As the hole is noticed it is good practice to examine the corresponding sclera for thinning, abnormal vortex veins and scleral vessels.

LINCOFF'S RULE

1. A shallow inferior RD in which the SRF is slightly higher on the temporal side points to a primary break on that side.
2. A primary break located at 6 o'clock will cause an inferior RD with equal fluid levels.
3. In bullous inferior RD the primary break usually lies above the horizontal meridian.
4. If the primary break is located in the upper nasal quadrant, the SRF will revolve around the optic disc and then rise on the temporal side until it is level with the primary break.
5. A sub-total RD with a superior wedge of attached retina points to a break located in the periphery nearest its highest border
6. When the SRF crosses the vertical midline above the primary break is near to 12 O'clock, the lower edge of the RD corresponding to the side of the break.

Break may be difficult to detect in large bullous RD due to elevation and certain times when it is hidden between folds.

Protocol for marking the hole before applying cryo		
• Atrophic round hole	-	Single postr edge mark
• Small flap tear	-	Single postr edge mark
• Large flat tear	-	Antr and postr edge mark
• Multiple breaks close together	-	Most Postr break mark
• Retinal Dialyses	-	Radial margin of the most postr part & circumferential margin in clock hours
• Bullous RD	-	Parallax Occurs. So put first mark Over the least elevated area

Slit Lamp Indirect biomicroscopy

Is the ideal form for examination of the posterior pole using preferably non contact lenses with advantage of stereopsis.

SPECIAL TECHNIQUES

1. **Ultrasonography :** RD echo should be separated from the choroid by at least 1.5mm. Total RD has insertion at ora serrata and disc. It has 100% reflectivity with moderate after movement. Detachment with PVR can be detected by B scan.

SCAN MODE	RD	CD	PVD
B scan	Disc insertion	No disc insertion	No disc insertion
	Minimal after movement	Smooth, dome shaped	Max after movement
A scan	100% spike	Thick double high spikes	Low to med spikes

2. **ERG :** In RD is subnormal or extinguished. But is generalized response and small localized detachments are missed.
3. **FFA :** Role in choroidal tumours or metastasis with exudative RD.
4. **Fundus Photograph** : For documentation.
5. **Transillumination :** Performed in a dark room through a fully dilated pupil by transcleral or transcorneal route.

Bed Rest

It is very relevant in cases of superotemporal involvement because the SRF by gravity may detach the macula. Bedrest with head end lowered position and double padding of the eye is essential before surgery is contemplated.

SURGERY

"All holes have a detachment

and All detachment have their holes"

- Jules Gonin

The aim to RD surgery is to reattach the retina as quickly as possible by the most effective and least traumatic method with permanent closure of all retinal breaks.

Aim of RD Surgery
To see the hole ↓ Seal the hole ↓ SRF drainage ↓ Scleral buckling

This is the golden standard of RD surgery.

A. Visualisation and Marking of the break

Even though a complete fundus diagram is available on the table every attempt should be made to reassess the detachment, nature of holes and to mark the holes with diathermy.

B. Methods to produce Chorioretinal adhesion

1. **Diathermy:** Utilizes RF currents of 13 MHZ frequencies to generate heat in the tissues due to electrical resistance. Scleral dissection is necessary to produce a thin uniform scleral bed for diathermy, Applications are made in rows of 1-2 mm apart, 3-5 seconds duration parallel to the equator. End point is slate grey discoloration twice the size of electrode.

RD SURGERY INSTRUMENTS

VAPOCLAVE - GAS STERILISATION UNIT

2. **Cryopexy :** Works on the principle of Joule Thomson effect. Nitrous Oxide or CO_2 can be used. Retinal cryoprobe should reach temperature of -79^0 to -90^0. End point is graying of the overlaying retina.

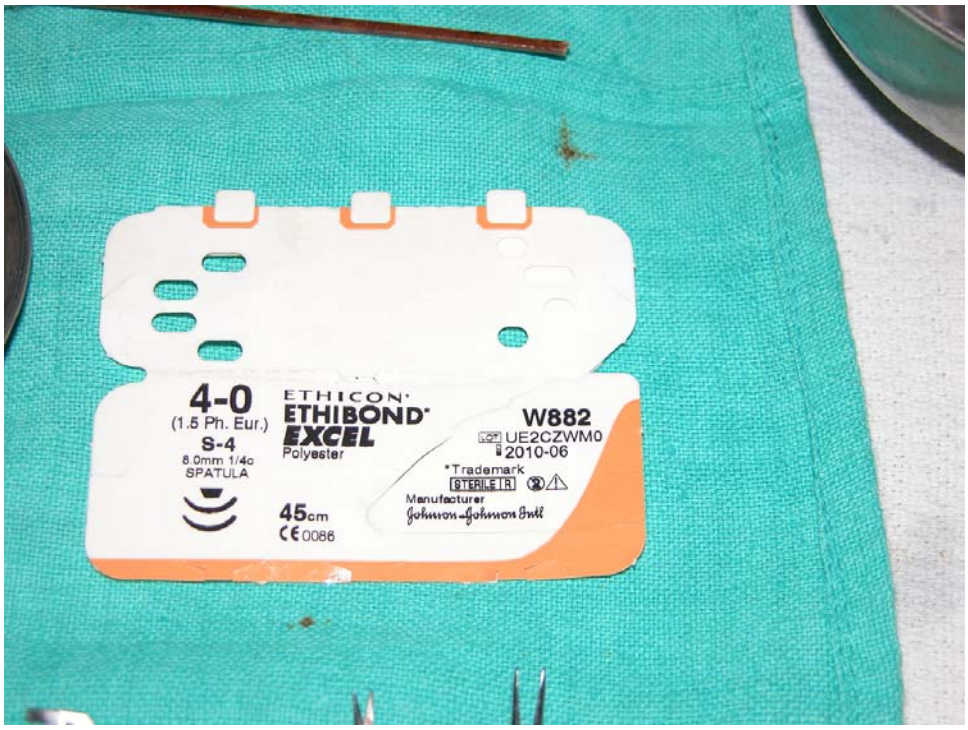
Relative Advantages

Cryopexy	Diathermy
1. No scleral shrinkage	1. Need not be contiguous as cryo
2. Doesn't damage vessels	2. Less disruption of RPE and less fragmentation - less likely to cause PVR
3. Can be applied over staphyloma	3. Rupture of Bruch's membrane is possible with cryo
4. Even in wet sclera after accidental SRF drainage	4. Early adhesion

3. **Photocoagulation :** Is used in

- Prophylactic treatment of Breaks.
- Following vitrectomy in the form of Endolaser
- In pneumatic retinopexy after the break is reattached.
- In treatment of macular hole.

SUTURE MATERIAL



SILICON SPONGE

Laser can be applied through a S/L delivery system, Laser Indirect ophthalmoscopy & Endolaser. But laser is not very useful in the presence of SRF because laser energy cannot reach through and produce chorioretinal adhesion.

The lasers currently available are:

Gas lasers	Solid state
Argon	Ruby
Krypton	Nd YAG
Helium Neon	Tunable dye
CO_2	Diode

C. Methods to produce RPE and Neurosensory Retina Apposition

The methods available are:

1. Scleral buckling
2. Pneumatic retinopexy
3. Vitrectomy with internal tamponade

1. Scleral Buckling

The advantages of this procedure are :

- Relief of VR traction due to the effective reduction in the diameter of the Globe.

Hydrogel : Combines the advantage of both rubber and sponge. Postop it swells up for additional heightening of the buckle.

The mode of placement:

INDIRECT OPHTHALMOSCOPE

MARKING THE BREAKS

The mode of placement of a buckle is either a implant or explant. Implant is the placement of the buckle in a uniformly thin scleral bed where the application of cryo is smooth. No implant exposure. But the disadvantages are it is time consuming and can cut through and cause perforation. Explants are commonly used. The nature of the explant can be

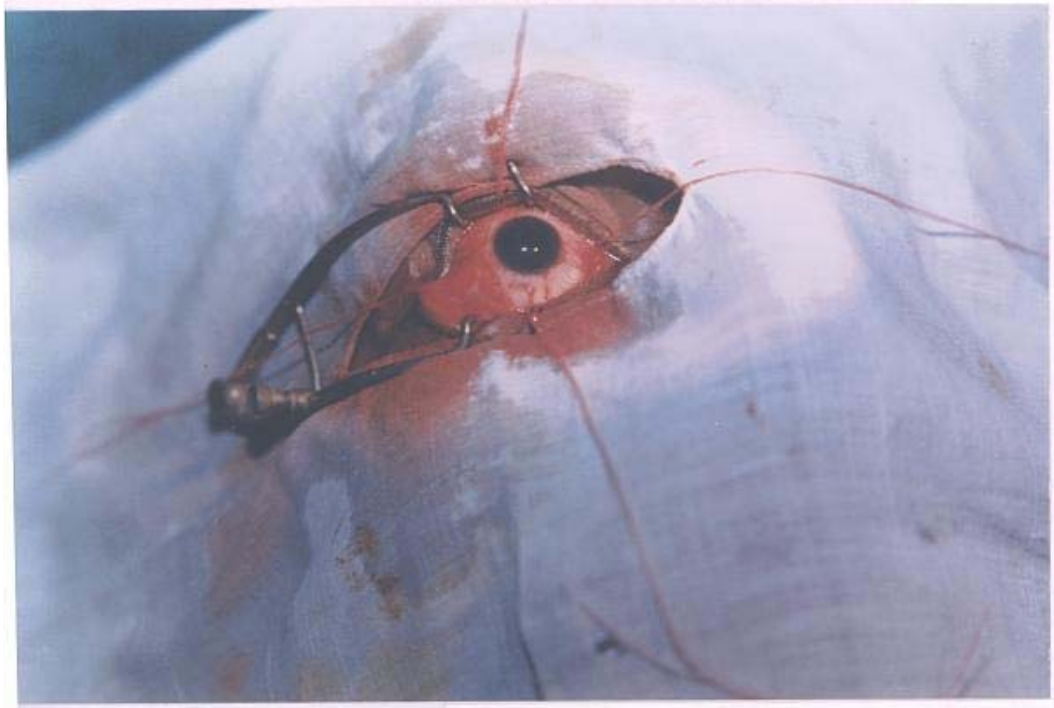
Radial	Segmental circumferential	360^0 encirclage
• Placed at right angle to the limbus	• Benign dialyses	• Breaks of 3 or more quadrants
• Medium to large holes	• Multiple breaks located in one or two quadrants	• Lattice degn. Involving three or more quadrants
• Horse shoe tear for supporting the tear in its long axis.	• Anterior breaks	• Extensive retinal detachment without detectable breaks
• Very posterior breaks	• May be 180^0 or 270^0 depending on the detachment	• Mild PVR early
• When there is risk of postop fish mouthing can be combined		• Failed local procedure

In Aphakic and pseudophakic eyes with total RD and multiple holes encirclage is the treatment of choice.

Suturing methods:

Prolene 4-0 or 5-0 with a spatulated needle is the suture material of choice. Mattress fashion sutures parallel to the long axis of the elements being supported are used. Meridional bands are fixed with mattress sutures placed perpendicular to the long axis of the element. The sutures are placed a minimum 3 mm further apart than the width of the scleral element. The vortex veins and their tributaries must be avoided. The tip of the needle should always be in

SUPERIOR RECTUS BRIDLE SUTURE



360 PERITOMY & BIRDLE STRUCTURE

sight.

Knots are usually tied anteriorly but if a small buckle is being used knot should be posterior for better cosmetic appearance.

D. Management of SRF

The rationale for drainage is to diminish intraocular volume so as to allow elevation of the buckle without difficulties and to allow the retina t settle on the elevated buckle. It also brings together the RPE and the neurosensory layer.

Indications for SRF drainage

- Difficulty in localization of breaks especially in a highly elevated bullous RD.
- Immobile retina
- Inferior equatorial tears
- Eyes with raised IOP
- Old RD with very viscous SRF

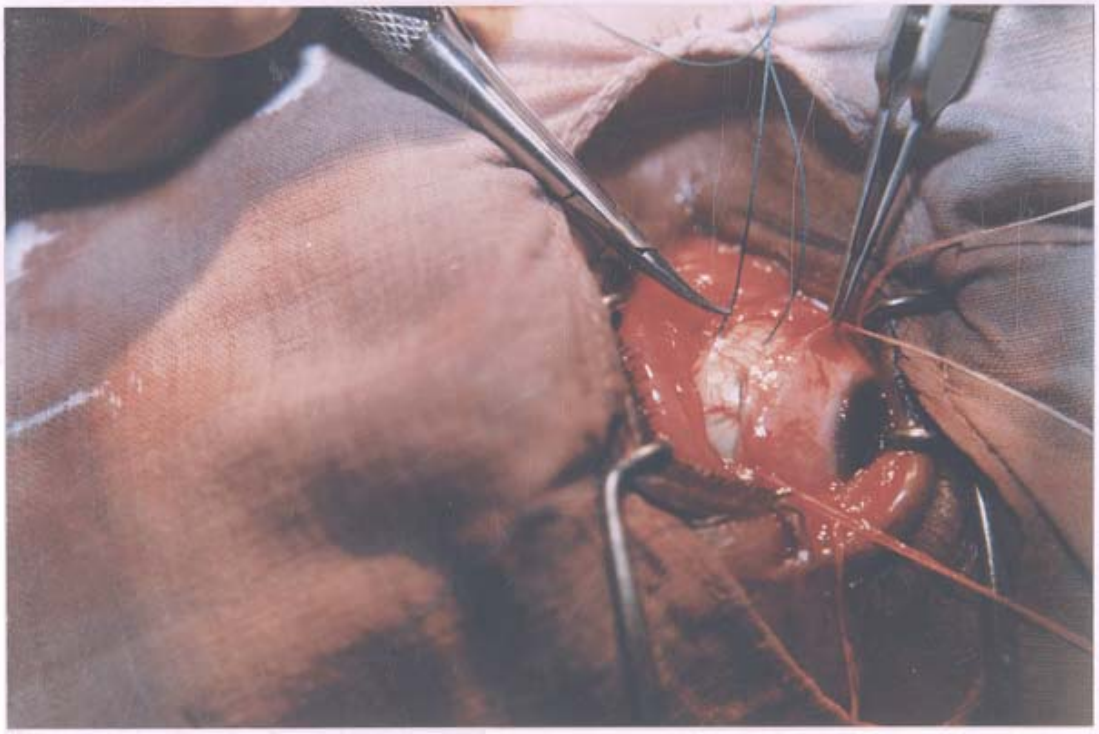
In internal procedures SRF maybe drained by retinotomy or even Argon laser. The DACE technique favours early SRF drainage (Drainage + Air + Cryo + Explant). A radial sclerotomy is done at the site of maximum detachment or usually the inferotemporal quadrant avoiding the vessels. Preplaced sutures and cryo around the site are applied with the 26 gauge needle attached to a syringe directed properly. SRF drained passively.

Indications for SRF Drainage

RETINAL CRYOPROBE

CRYOPEXY IN PROGRESS

Complications of SRF drainage
• Chorodial haemorrhage • Iatrogenic break formation • Retinal incarceration • Vitreous prolapse • Damage to the posterior ciliary arteries and nerves • Endophthalmitis



4-0 PROLENE MATTRESS SUTURE

ENCIRCLAGE IN PROGRESS

COMPLICATIONS OF SURGERY

INTRA OPERATIVE COMPLICATIONS

a. During diathermy

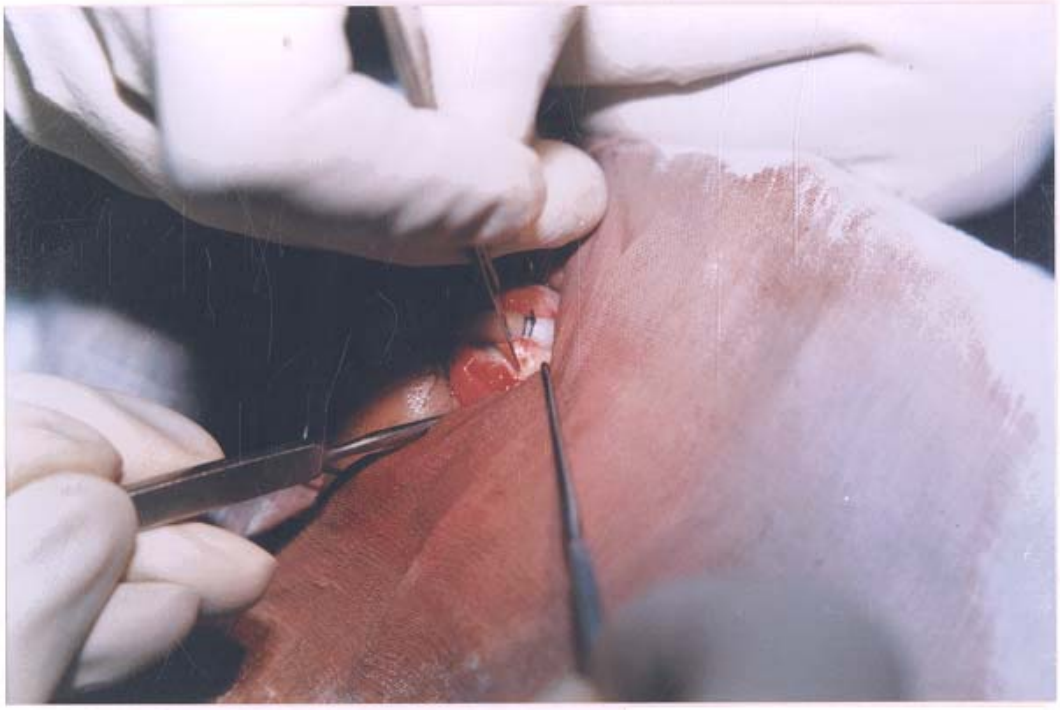
1. Diathermy is difficult to apply if the scleral surface is wet where inadequate effect may be achieved.
2. Diathermy over a long posterior ciliary artery may cause occlusion of the vessel, subsequently leading onto anterior segment ischemia.

b. During Cryotherapy

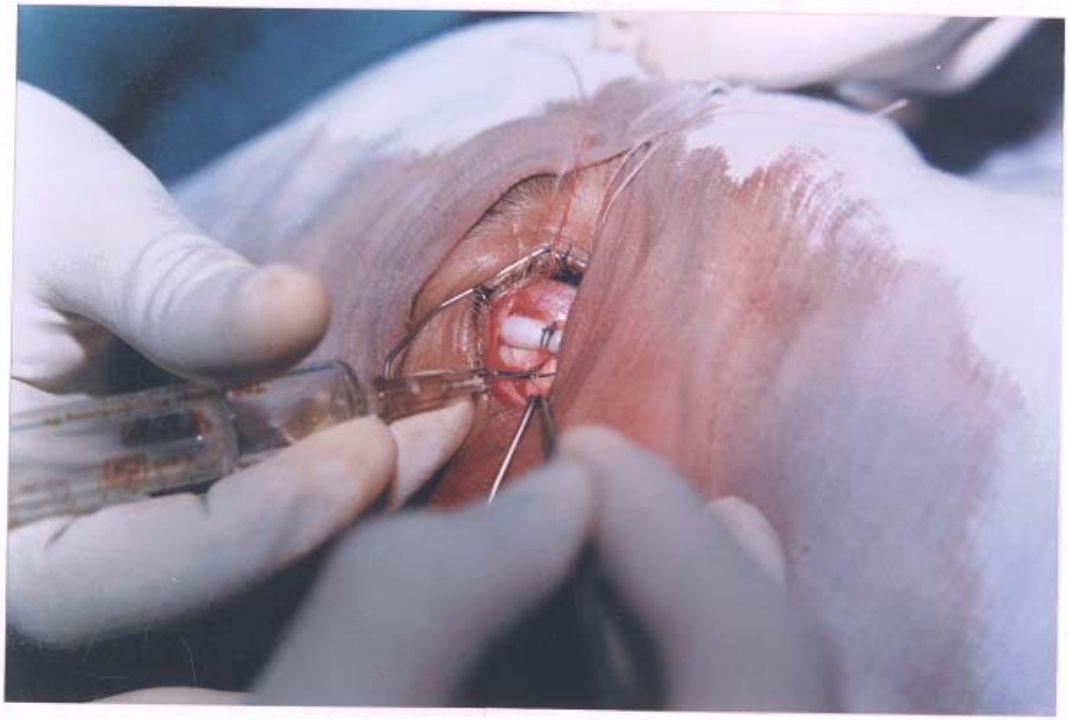
1. Inadvertent freezing of the lids may cause marked postoperative lid oedema.
2. Premature cracking may result in scleral rupture more so when sclera is thin.
3. Freezing over a prominent vessel running in the operculum may result in haemorrhage. Choroidal haemorrhage may occur if cryotherapy is applied in the region of the vortex veins.
4. Pigment fallout occurs from excessive cryotherapy due to over-freezing or repeated freezing of the pigment epithelium. This is implicated in the causation of PVR.

c. During buckling and scleral suturing

1. During lamellar scleral dissection if the flap taken is too thin, the mattress sutures holding the flaps over the implant may tear out of the flaps or the flap may tear away from the sclera.
2. Unintentional perforation of the scleral bed may allow intrusion of the implant into the eye during surgery.



SCLEROTOMY



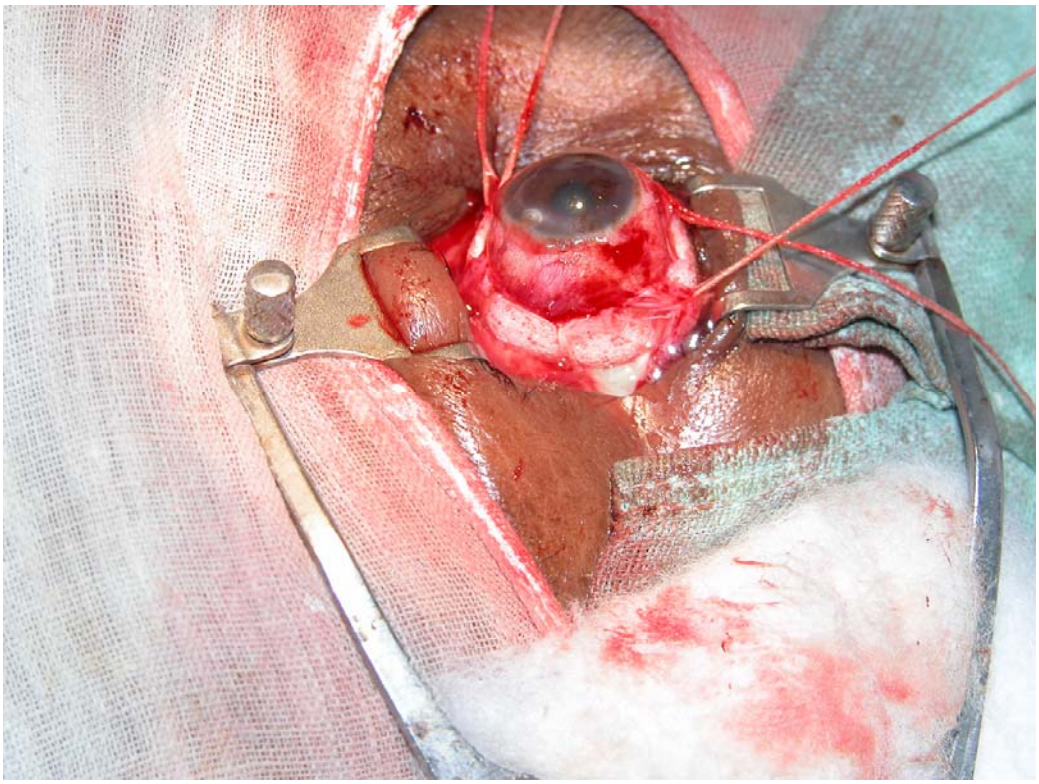
SRF DRAINAGE

3. Globe perforation can occur while taking scleral sutures.
4. Corneal clouding is usually caused by epithelial oedema from increased intraocular pressure. Epithelium may also become damaged by desiccation or mechanical trauma during the procedure.
5. Damage to vortex veins can occur during placement of scleral sutures.

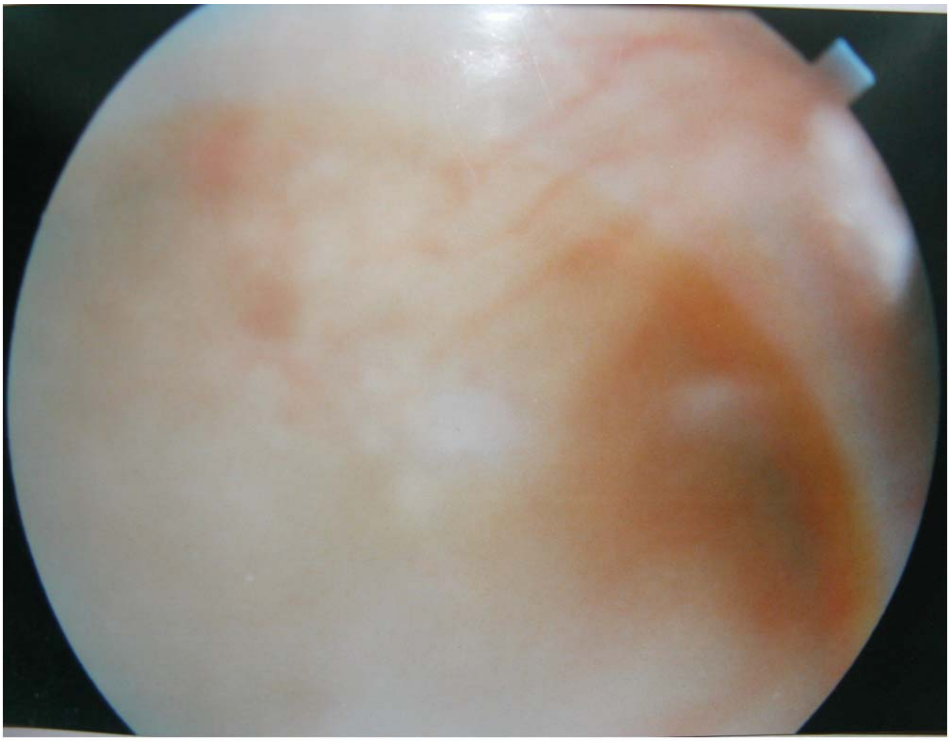
d. SRF drainage complication

1. Dry tap usually results from failure to completely perforate the choroid.
2. Chorodial haemorrhage is the most important and dangerous complication of RD. it may occur at time of perforation and release of SRF or after fluid has been drained.
3. Retinal haemorrhage occasionally will result from direct trauma by the perforating needle of cautery to the underlying retinal blood vessels.
4. If the SRF is very shallow at the site of drainage, retina may become incarcerated after the flow of SRF has started. If incarceration occurs no attempt should be made to disengage the retina as this may produce iatrogenic retinal tears.
5. Prolonged elevation of IOP above the systolic pressure following excessively tight scleral buckle leads to CRAO. This can be prevented by checking the perfusion of CRA by indirect opthalmoscopy.

ENCIRCLAGE COMPLETED



POST OPERATIVE – CRYO AND BUCKLE EFFECT



POST OPERATIVE COMPLICATIONS

Early Complications

1. **Oedema of the periocular tissues :** Oedema of the periocular tissues with pain is common as result of cryotherapy and also due to the amount of tissue handling during the surgery.
2. **Persistent detachment:** Should be differentiated from a subsequent redetachment. The causes for persistent detachment are (a) unsealed retinal break due to improper cryoapplication and placement of buckle. Commonly occurs in bullous RD where holes are wrongly marked due to parallax. (b) Posterior breaks which are very difficult to reach by cryoprobe (c) Missed breaks.
3. **Anterior Segment ischemia:** This is caused by poor perfusion of the anterior segment. It is commoner following encircling operations and when one or more of the rectus muscles have been disinserted during surgery.
4. **Sterile Uveitis:** This is due either to excessive trauma or to excessive cryotherapy.
5. **Choroidal detachment:** Is caused by transudation of choroidal fluid into the suprachoroidal space. The most common predisposing factor is prolonged severe ocular hypotony following drainage of large volume of SRF. Majority of choroidal detachments resolve spontaneously within 2 weeks.
6. **Endophthalmitis:** This devastating complication is much less common after RD surgery.

Late Complications

1. **Buckle extrusion and infection:** It is rarely seen now a days because of improvement in suturing techniques and subtenon antibiotics at the end of operation.
2. **Recurrent retinal detachment:** Late failure is defined as initial reattachment of retina and subsequent re-detachment. The causes are (a) PVR is the most common cause. (b) Reopening of retinal break from inadequate chorioretinal reaction or to late buckle failure from slippage of an encircling element anteriorly or posteriorly, spontaneous extrusion of the buckle, removal of buckle due to infection or exposure. (c) New break formation.
3. **Ocular motility disturbance:** This occurs especially if the rectus muscle has been disinserted or large explants have been placed under them.
4. **Maculopathy:** Following surgery the macula may be damaged in a number of ways.
    a. Premacular gliosis either in the form of cellophane maculopathy or macular pucker may occur after any type of retinal surgery.
    b. Atrophic maculopathy is usually secondary to gravitation of blood in the subretinal space from intraoperative choroidal haemorrhage.
    c. Cystoid maculopathy typically occurs in eyes with longstanding RD.
    d. Pigmentary maculopathy is caused by pigment fallout resulting from excessive cryotherapy.
5. **Refractive Changes:** Commonly seen with encircling bands.

PNEUMATIC RETINOPEXY

Is an outpatient office procedure usually done in an uncomplicated RD with small breaks less than 2 clock hrs situated in upper 2/3 periphery, like isolated tear under superior rectus and

optic pit with macular detachment etc. Contraindications are eyes with elevated IOP, patients in whom positioning is not possible, inferior breaks and PVR of Grade C and above.

Expansile	Non expansile
SF6	Air
C_2F_6 (perfluoro ethane)	CO2
C_2F_8 (perfluoro propane)	Ag, Kr, Helium

Agent	Dose	Expansion	Max Exp. (hrs) time	Half time (days)	Duration in weeks
SF_6	0.5 ml of 100%	x 2	24-48 hrs	3-5	2 wks
C_2F_6	0.3 ml of 100%	x 3.3	48-72 hrs	10-14	3 wks
C_3F_8	0.3 ml of 100%	x 4	72-96	21-25	> 4 wks

After Pneumatic Retinopexy proper positioning should be maintained so that the break is uppermost at least 16 hrs a day. No air travel allowed as Gas will expand. 20-40% of routine primary Rhegmatogenous RD can be managed this way.

PARSPLANA VITRECTOMY WITH INTERNAL TAMPONADE

Indicated in selected Rhegmatogenous RD where causative break cannot be closed by conventional buckle and when severe PVR has already complicated the picture. Severe cloudy media causing poor visualization is also an indication.

The Instrumentation needed is:

- BIOM or corneal C/L to aid viewing.
- Vitreous cutter with 800 oscillations/mt.
- Endoillumination with 20 gauge fibreoptic probe.
- Infusion cannula, Vitreous scissors, cutter and backflush flute needle.
- Endolaser (preferable)
- Vitreous replacement substances

PVR is tackled by manipulations like peeling, segmentation or delamination and hole sealed with endolaser. SRF may be drained with internal retinotomy. Perfluorocarbon liquids or silicone oil is used as a replacement agent with ability to cause internal tamponade.

Silicone oil	Perfluorocarbon liquids
• Buoyant and Light • Floats • Needs to be removed	• Dense and Heavy • Settles down • May be left behind

Complications are as for any other vitrectomy plus that of the tamponade agent. SF_6 can cause Glaucoma, Inverse hypopyon, Endothelial decompensation, or can migrate through the break and increase the RD.

Prophylactic cryopexy is indicated in
• Break in Aphakic or pseudophakic eye • Symptomatic tear with flap • Subclinical RD (i.e.) Break with SRF just around 1 DD of elevation. • Break more than 30^0 • Any break with manifest traction on an edge, usually a flap held out by traction • Other eye RD • Family H/O RD.

PROGNOSIS

Anatomic success

The primary reattachment rate after RD surgery is 83.3%. The redetachment rate is 16.7%. Resurgery has a attachment rate of 95%. (Framme C *et al.,* 2000). After vitrectomy with silicone oil the rates are similar (Newman *et al.,* 1999). In spite of Phacoemulsification the risk factors are not changed.

Functional success

Visual results of RD surgery depend on duration of RD, status of Macula, age of patient, associated choroidal detachment, PVR and Macular pucker. Approximately 40-50% of patients regain V/A of 6/18 or better. 75% of patients with macular detachment of less than 1 wk duration attain 6/18 or better. Patients should not be discouraged if initial acuity is poor because the retina recovers. Vision may continue to improve for upto a year.

Failed surgery

Occurs in 10-12% and the reasons are (a) failure to seal the breaks (b) failure to produce good chrioretinal adhesion (c) Retinal redetachment after a initial attachment due to new breaks or slipped buckle (d) Proliferative Vitreoretinopathy.

PART II

OBJECTIVES

1. To evaluate the etiological factors leading to Rhegmatogenous Retinal Detachment

2. To study the type of break and location of break

3. To study the relationship between the various etiological factors and the occurrence of retinal breaks

4. To study the relationship between the location of retinal breaks and the extent of Retinal Detachment

5. To access the outcome of treatment in lieu with the duration, risk factors and extent of Retinal Detachment.

MATERIALS AND METHODS

This study was carried out at Retina clinic, Regional Institute of Ophthalmology and Government Ophthalmic Hospital, Chennai during the period of November 2004 to January 2006.

This study was a prospective study where patients were registered, evaluated, treated and followed up during the study period.

INCLUSION CRITERIA

Patients with Rhegmatogenous Retinal Detachment reporting to the hospital for the first time during the study period were evaluated.

A series of 80 patients with Rhegmatogenous Retinal Detachment who were primiarly managed with sclerial buckling procedure using silicon explants were taken up for the study.

EXCLUSION CRITERIA

1. Patients operated before the specified period and coming for review
2. Patients who were unwilling to under go surgery
3. Patients with re-detachment and detachment with sever PVR which needs vitrectomy were excluded from the study.
4. Patients with co-morbid conditions like vitreous hemorrhage, choroidal detachment, IOFB, Optic nerve avulsion were excluded.

PRODEDURE

All patients were screened in the out-patient department for a brief history duration of complaints and anterior segment examination. Details regarding any history of trauma, cataract surgery, and refractive status of the eye were noted.

Evaluation of the visual status, dilatation and retinoscopy was routinely done. The patient underwent detailed ophthalmic and systemic evaluation, Pupils were dilated with cycloplegic. Anterior segment examination with a slit lamp biomicroscope was done paying attention to corneal, lenticular and vitreous opacities which hinders fundus visualization. Signs of uveitis and pigment dispersion in the vitreous phase were looked for.

Posterior segment examination using a binocular indirect ophthalmoscope with scleral depression was done in all patients. Three mirror examination was also done. Detailed fundus drawings of both the eyes were done in all cases on standard fundus charts using the internationally accepted color coding.

Patient's general health was assessed. Patient underwent blood pressure recording, blood sugar analysis and urine analysis. X-ray chest, and ECG were done as and when deemed necessary. B-scan USG was done. Fundus photograph was also taken for documentation in selected cases.

Strict bed rest was advised in all cases.

Anaesthesia

In cases operated under local anaesthesia facial and retrobulbar blocks with xylocaine 2% was given. General anaesthesia was used in paediatiric cases.

Pupils were dilated with mydriatics and cycloplegics.

Surgical procedure

Fundus diagram prominently displayed near the operation table. Skin preparation of all patients was with povidone-iodine and plastic adhesive sterile drape applied. Surgical procedure was uniform except for minor variation. 360º peritomy was done. Conjunctiva and tenons opened and relieving incisions made. Bridal sutures applied to all four recti taking care

to preserve the muscle sheath. Localization and confirmation of all the retinal breaks was done by indirect ophthalmocopy, with sceleral depression. Areas of tear marked on sclera using cautery.

Cryopexy was done for all retinal breaks and degeneration.

Silicon sponge (explant), anchored to the sclera using 4-0 ethibond temporary knots. Buckle selected according to the size, site and type of retinal breaks. Sponges placed at appropriate sites for various circumferential, radial and encircling band. The location of the buckle checked with the indirect ophthalmoscope.

SRF drainage done in the quadrant where maximum level of fluid was present. In most of the cases of total RD, SRF drainage was done at appropriate site.

Fundus was examined to see the position, height of the buckle, adequacy of drainage, and the state of retinal artery. Intraocular pressure was checked. When all parameters were adequate and satisfactory the buckling mattress sutures were made permanent, conjunctiva closed with 6-0 mersilk. Subconjunctival antibiotic injected at the end of the surgery. At the end of surgery Fundus was examined with indirect ophthalmoscope to see for anatomical reposition.

Post operatively all patients had only a uniocular bandage, systemic antibiotic and anti-infllammatory drugs were given for a week. Daily post operative dressings with cycloplegics, antibiotics and steroid drops was performed. Fundus evaluation with indirect ophthalmoscope was done on third post operative day and again at the end of first week. Patient was discharged after one week.

Review

Review patient was asked for regular follow up every ten days for three visits, every month for three visits and every three months hence forth. At each visit the status of anterior segment, fundus visual acuity was checked and recorded in all the patients. The other eye is also considered high risk and periodically examined under full dilatation.

OBSERVATION

Eighty patients with Rhegmatogenous Retinal Detachment were taken for the study.

1. Age distribution

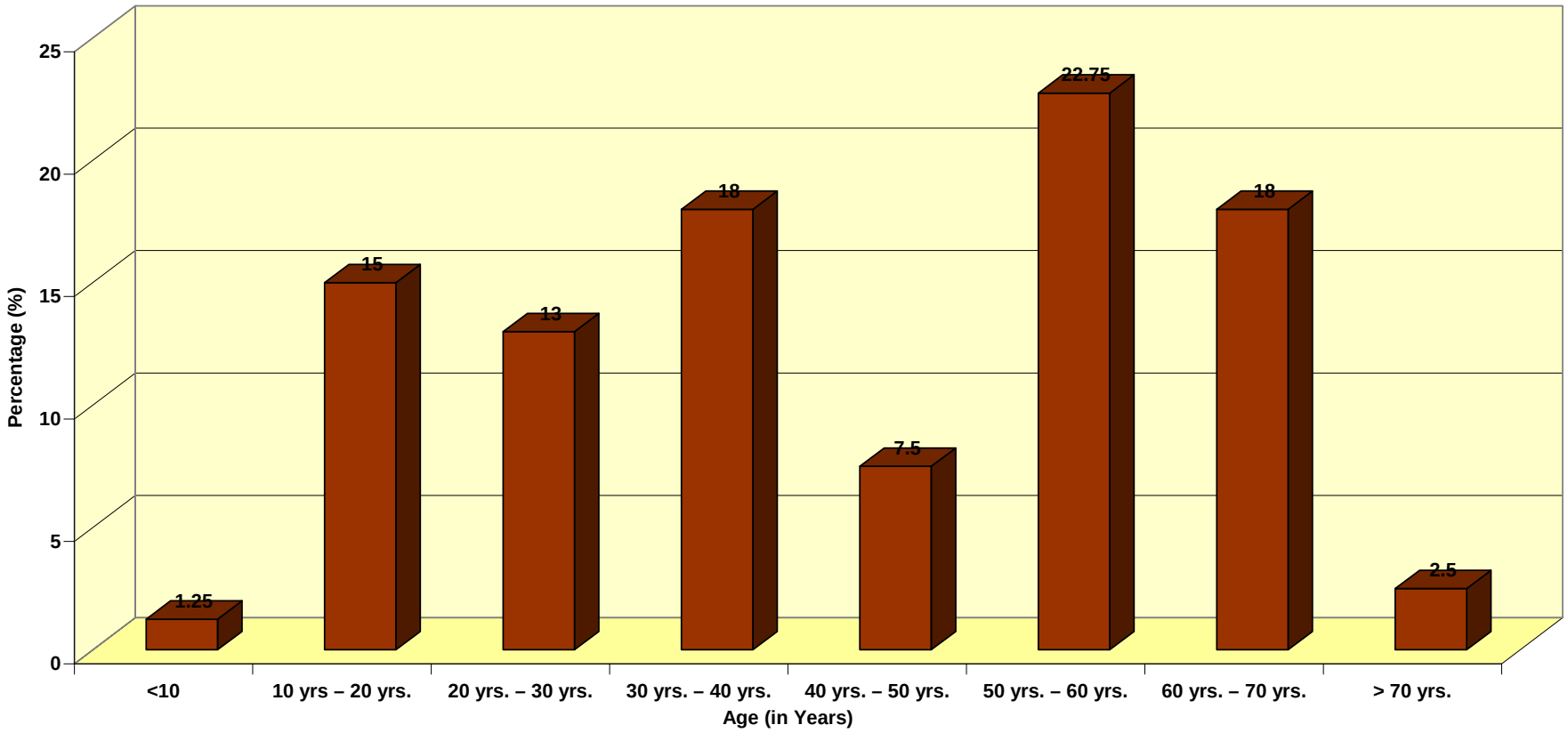
Age in years	No. of cases	Percentage %
>10	1	1.25
10 yrs – 20 yrs.	12	15
20 yrs. – 30 yrs.	11	13
30 yrs. – 40 yrs.	14	18
40 yrs. – 50 yrs.	6	7.5
50 yrs. – 60 yrs.	18	22.75
60 yrs. – 70 yrs.	14	18
> 70 yrs.	2	2.5

Youngest patient was 9 years old and oldest patient was 80 years old. Most of the patients were in the age group of 50 to 60 years (i.e., 23%). This is in comparison with the study conducted by Laatikainen *et al.*, 1985 in his series of 342 patients in which he showed a mean age of occurrence of retinal detachment as 52 years.

2. Sex distribution

Sex distribution	No. of cases	Percentage %
Male	55	64
Female	29	36

Age Distribution



Males dominated the study. It was roughly five males for every three female. This compares with the study of Polkinghore P.T. *et al.,* 2004 who reported higher incidence of retinal detachment in males.

3. Laterality

Laterality	No. of cases	Percentage %
RE	49	61
LE	31	39

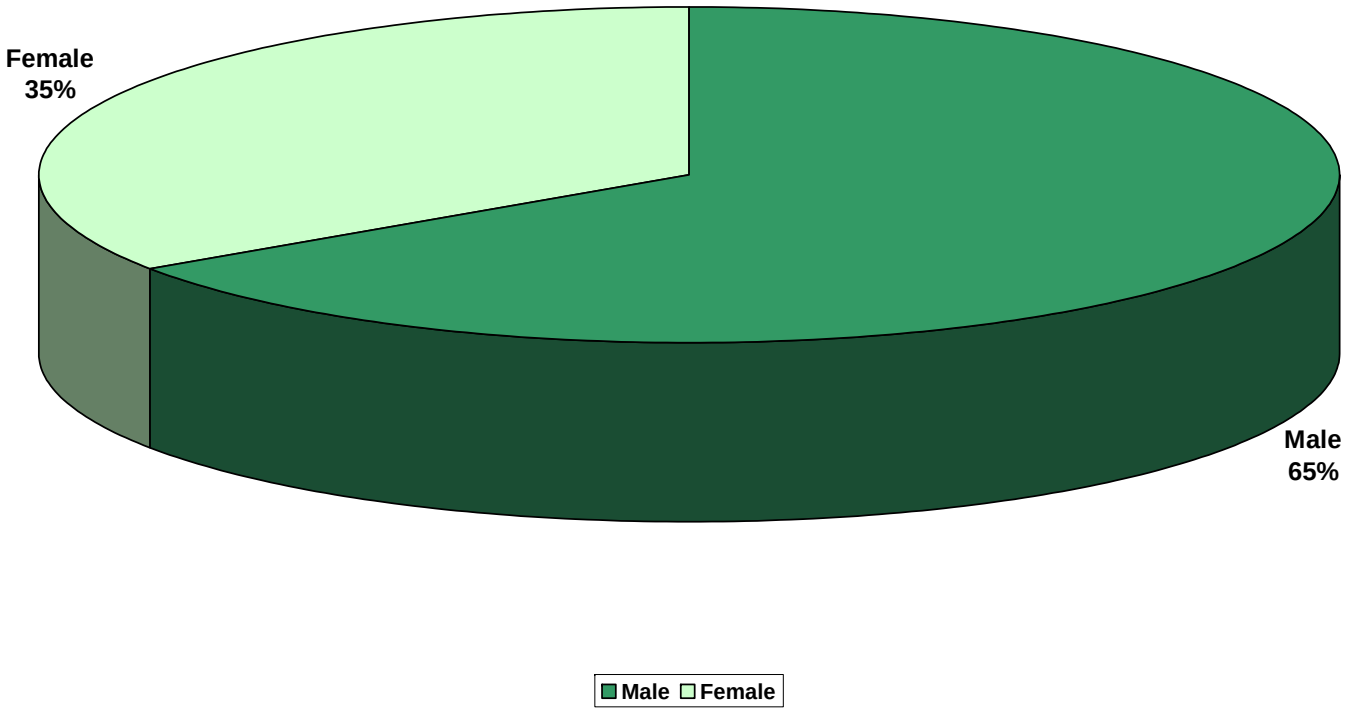
Right eye was affected in 61% of cases and left eye in 39% of cases. This compares with the study of Merin *et al.* 1970 who reported higher incidence of retinal detachment in right eye.

4. Type of eye

Type of Eye	No. of cases	Percentage
Phakic	51	64
Aphakic	8	10
Pseudophakic	21	26

Phakics had predominantly higher percentage of detachment. Some of them were myopic and some due to trauma. In Arruga series 72% occurred in phakic eyes.

Sex Distribution



5. Preoperative Visual Acquity

Preoperative Visual Acquity	No. of cases	Percentage %
6/6 – 6/18	2	2.5
6/24 – 6/60	6	7
5/60 – 1/60	18	23
CFCF	11	14
HM	27	34
PL	16	20

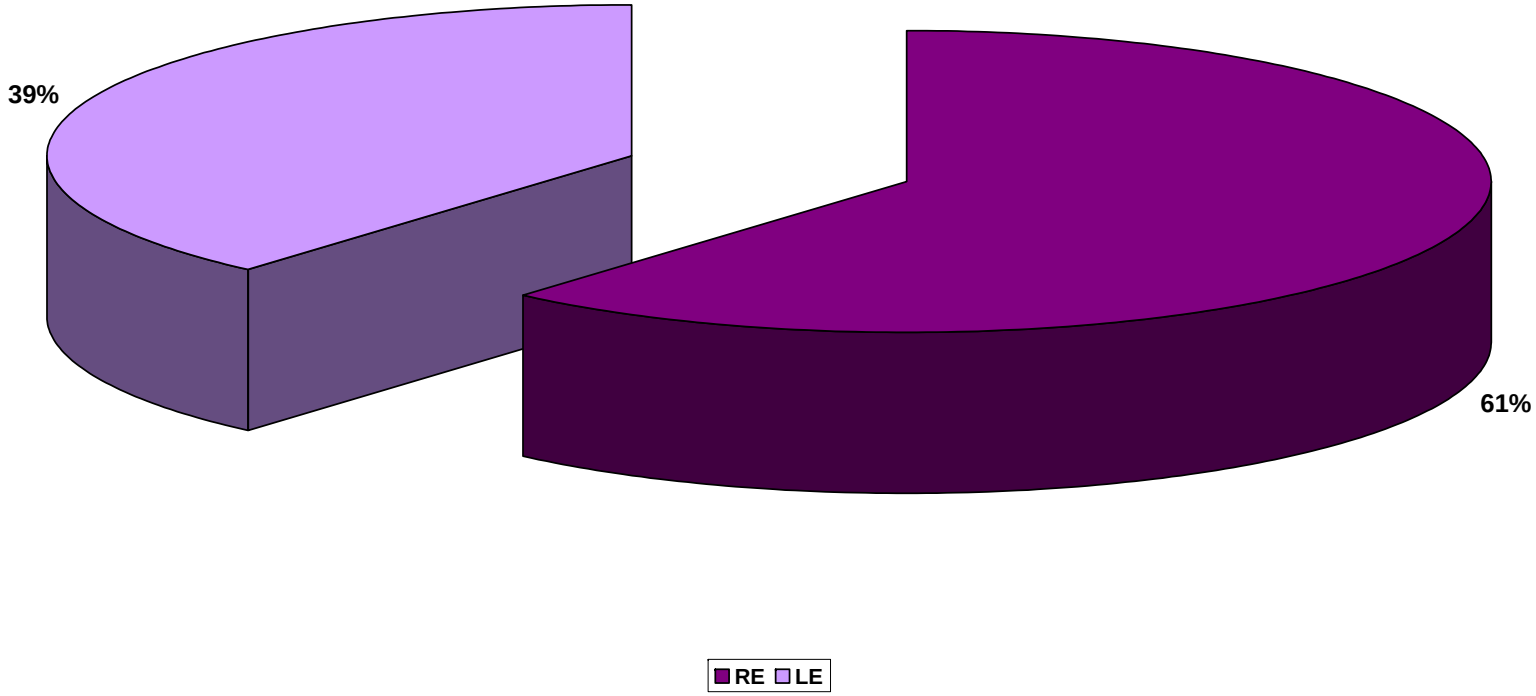
In majority of cases preoperative visual acquity was hand movements, because macula was detached and the patient reported late to our hospital.

6. Duration of complaints

Duration	No. of cases	Percentage %
Less than 2 weeks	18	22.5
2 weeks – 1 month	20	25
1 month – 2 months	15	18.75
3 months – 6 months	15	18.75
More than 6 months	12	15

47% of cases presented within one month of onset of complaints.

Laterality



7. Pattern of detachment

Detachment pattern	No. of cases	Percentage %
1 quadrant	9	11
2 quadrant	20	25
3 quadrant	12	15
Total	34	49

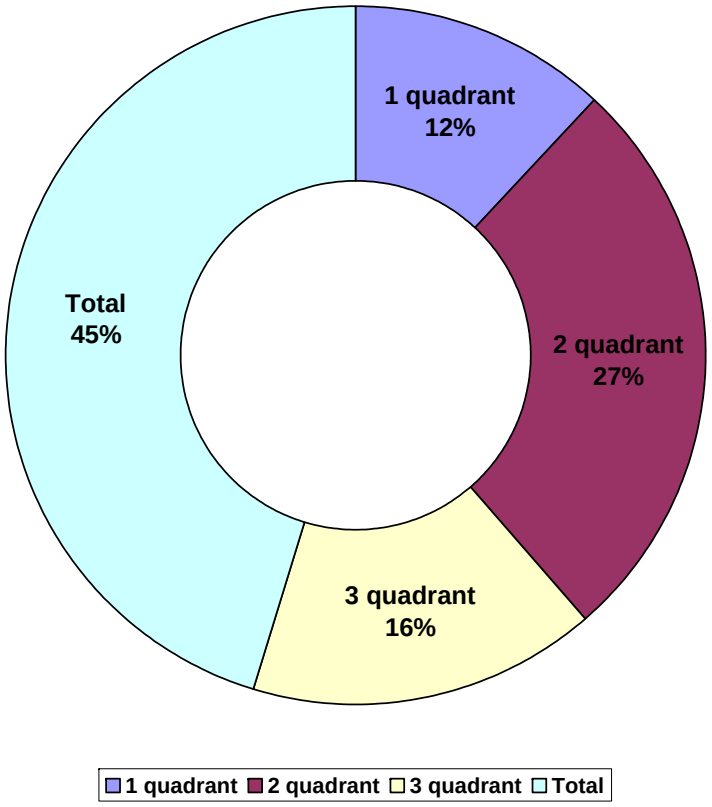
Majority of cases had a total detachment. These patients are particularly those who presented late to the hospital. As we are a tertiary referral hospital with referral from all over South India the logistics dictates the delay.

8. Status of Macula

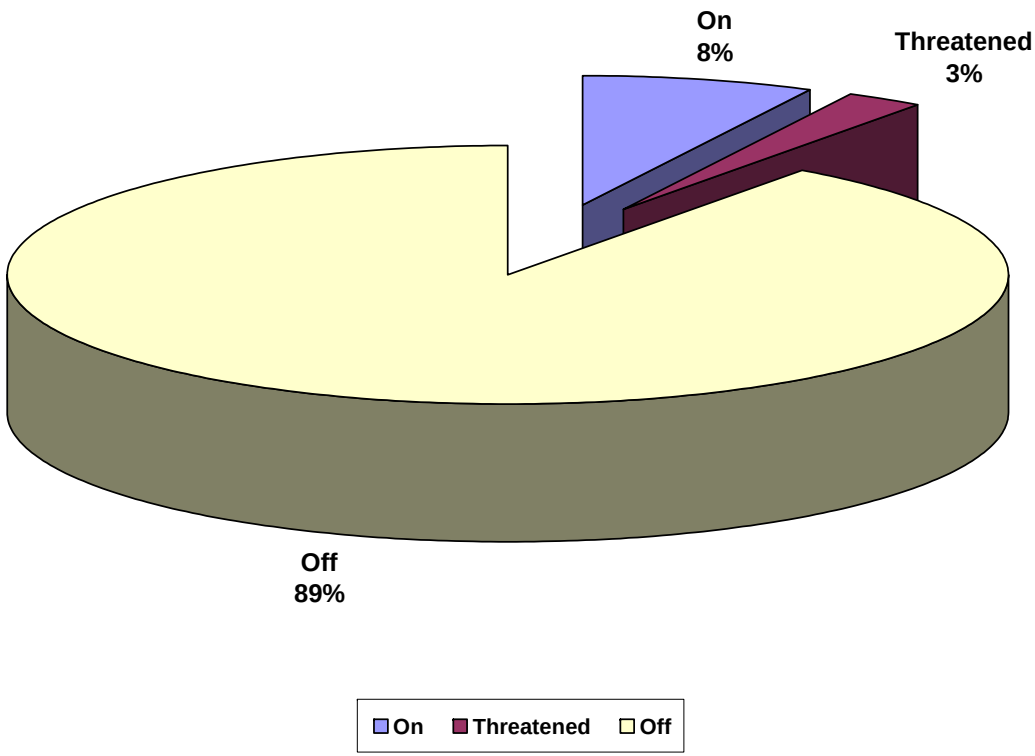
Status of Macula	No. of cases	Percentage %
On	6	7.5
Threatened	2	2.5
Off	72	90

Only 6 patients presented early with macula attached and the prognosis for postoperative visual outcome was better in such cases. 90% had macula off which correlated with total or subtotal detachment.

Pattern of detachment



Status of Macula



9. Number of Retinal breaks

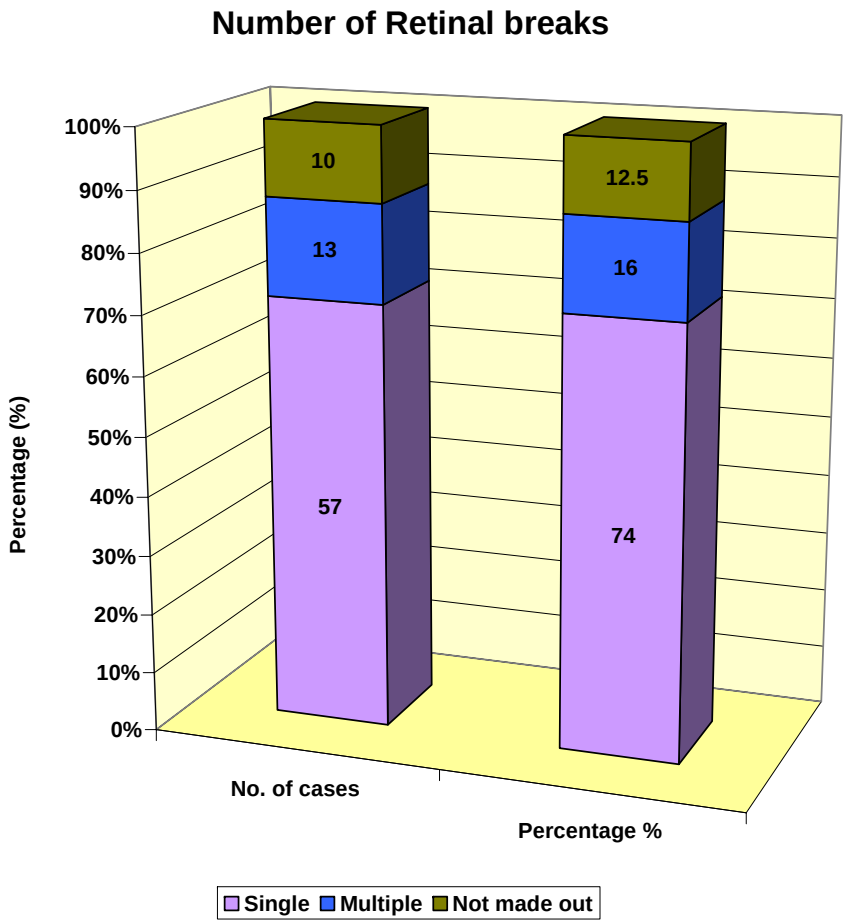
No. of Retinal Breaks	No. of cases	Percentage %
Single	57	74
Multiple	13	16
Not made out	10	12.5

Only single break could be made out in 74% of cases. Break could not be made out in 12.5% of the cases. Laatikainen L *et al.* 1985 in his study of rhegmatogenous retinal detachment reported 11% of cases in which breaks were not seen.

10. Breaks not seen

Etiological factor	Total cases	Breaks not seen	Percentage %
Aphakia	8	3	37
Pseudophakia	21	4	19
Trauma	21	3	14

Breaks were not seen in 37% of aphakes either because of undilated pupil or bullous retinal detachment. In four cases of pseudophakia, two were ACIOL and two were bullous retinal detachment. This compares with the study of Ahuja et.al., who showed in a study of 23% of aphakes breaks were not seen.


Number of Retinal breaks
100%
90%
80%
70%
60%
50%
40%
30%
20%
10%
0%
Percentage (%)
10
13
57
12.5
16
74
No. of cases
Percentage %
Single
Multiple
Not made out

11. Type of break

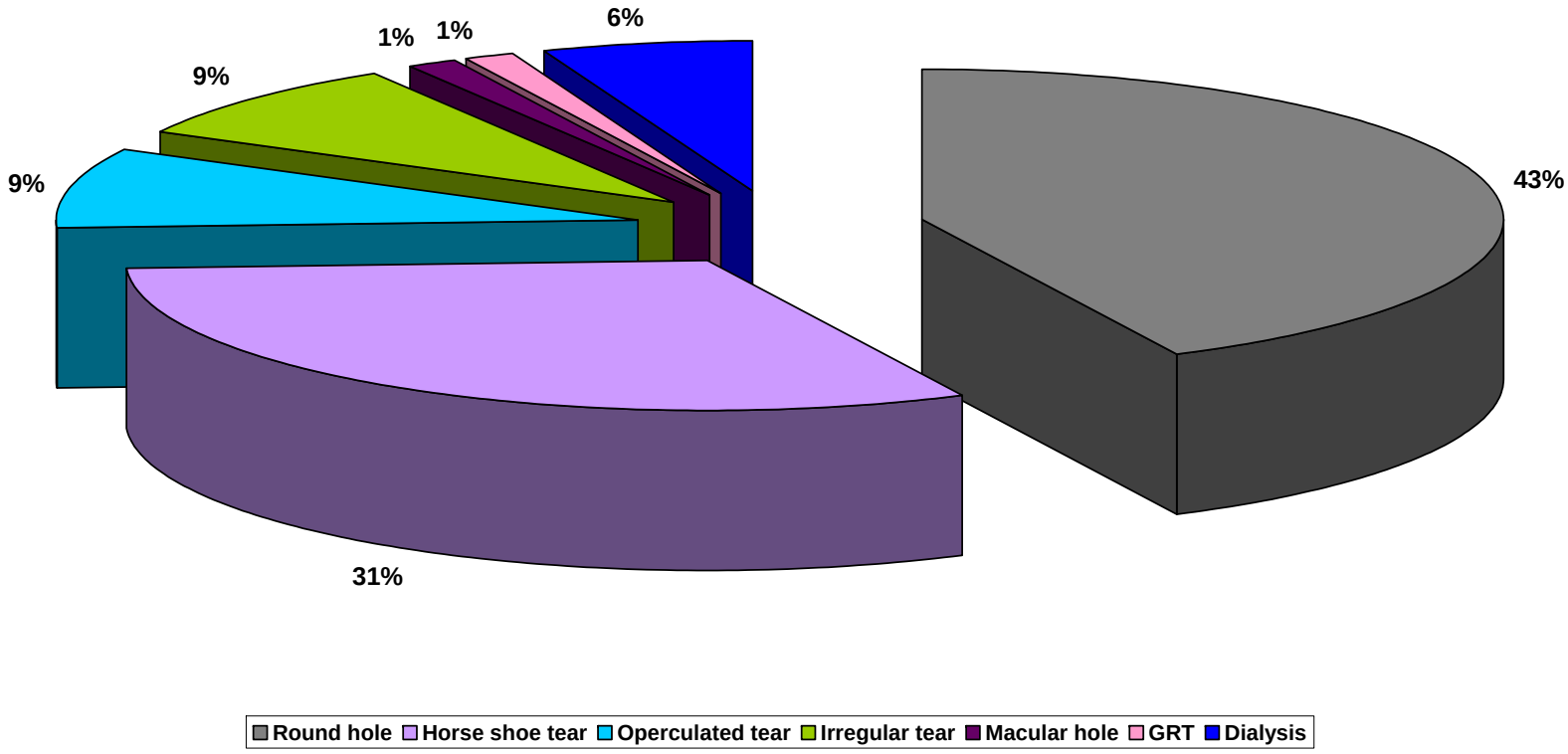
Type of break	No. of cases	Percentage %
Round hole	30	49
Horse shoe tear	22	31
Operculated tear	6	8.5
Irregular tear	6	8.5
Macular hole	1	1.4
GRT	1	1.4
Dialysis	4	5.7

Majority of the breaks were of round hole type. Next common was horse shoe tear. Dialysis occurred in cases of trauma. There was only one case of GRT in this study because those cases which were not suitable for external procedure alone were excluded from this study. In a series of 210 cases, Shapland *et al.* 1932 reported a higher incidence of round hole followed by horse shoe type.

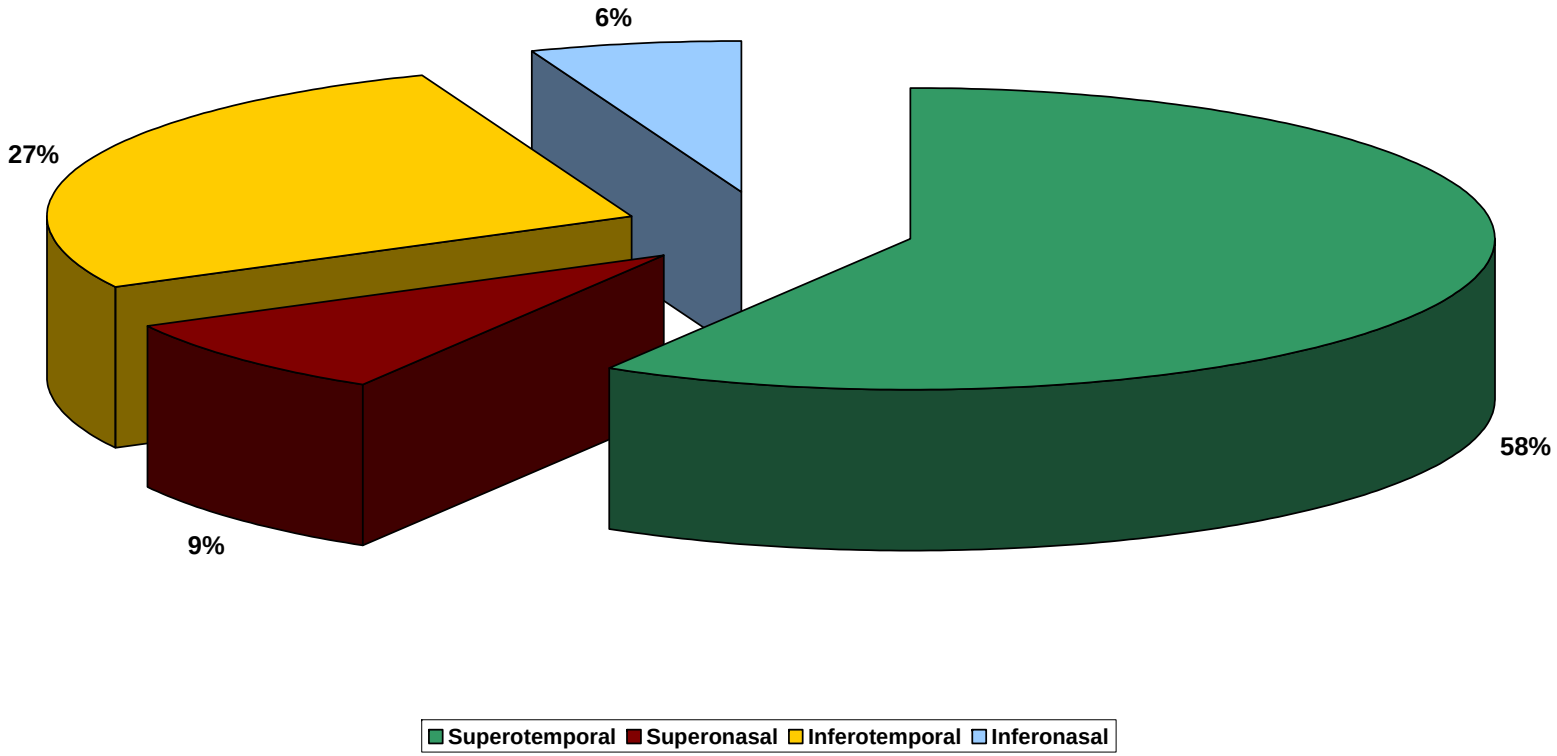
12. Quadrantic Location

Quandrantic Location	No. of cases	Percentage %
Superotemporal	41	59
Superonasal	6	8.5
Inferotemporal	19	27.1
Inferonasal	4	6

Type of Break



Quadrantic Location of Breaks



Highest percentages of breaks were located in the superotemporal quadrant. Next common was inferotemporal quadrant. Analyzing 951 cases of retinal detachment Smolin *et al.* 1965 reported superotemporal quadrant as the commonest location of break followed by inferotemporal, upper nasal and lower nasal respectively. In our study most of the breaks were either equatorial or between equatorial and periphery. Only three cases had posterior breaks.

13. Etiological risk factors

Known risk factors	No. of cases	Percentage %
Myopia	11	14
Lattice degeneration	7	9
Trauma	21	26
Pseudophakia	21	26
Aphakia	8	10
Fellow eye RD	2	2.5
Marfans syndrome	2	2.5
No significant risk factor	10	12.5

Post cataract surgery cases dominated our study. 36% of patients belonged to this group. The next frequency being trauma with 26%. Myopia and lattice degeneration constituted 23% of cases. Nicuula et *al.* 2001 found out in his study, cataract surgery as a significant risk factor for retinal detachment especially if associated with vitreous loss.

14. YAG CAPSULOTOMY AND DURATION FROM CATARAT SURGERY

Out of 21 pseudo phakic cases, 8 cases had a history of YAG capsulotomy being done.The timing of YAG capsulotomy after cataract surgery are :

Duration	No. of cases	Percentage %
0 – 3 months	3	37.5
3 – 6 months	2	25
6 months – 1 year	3	37.5

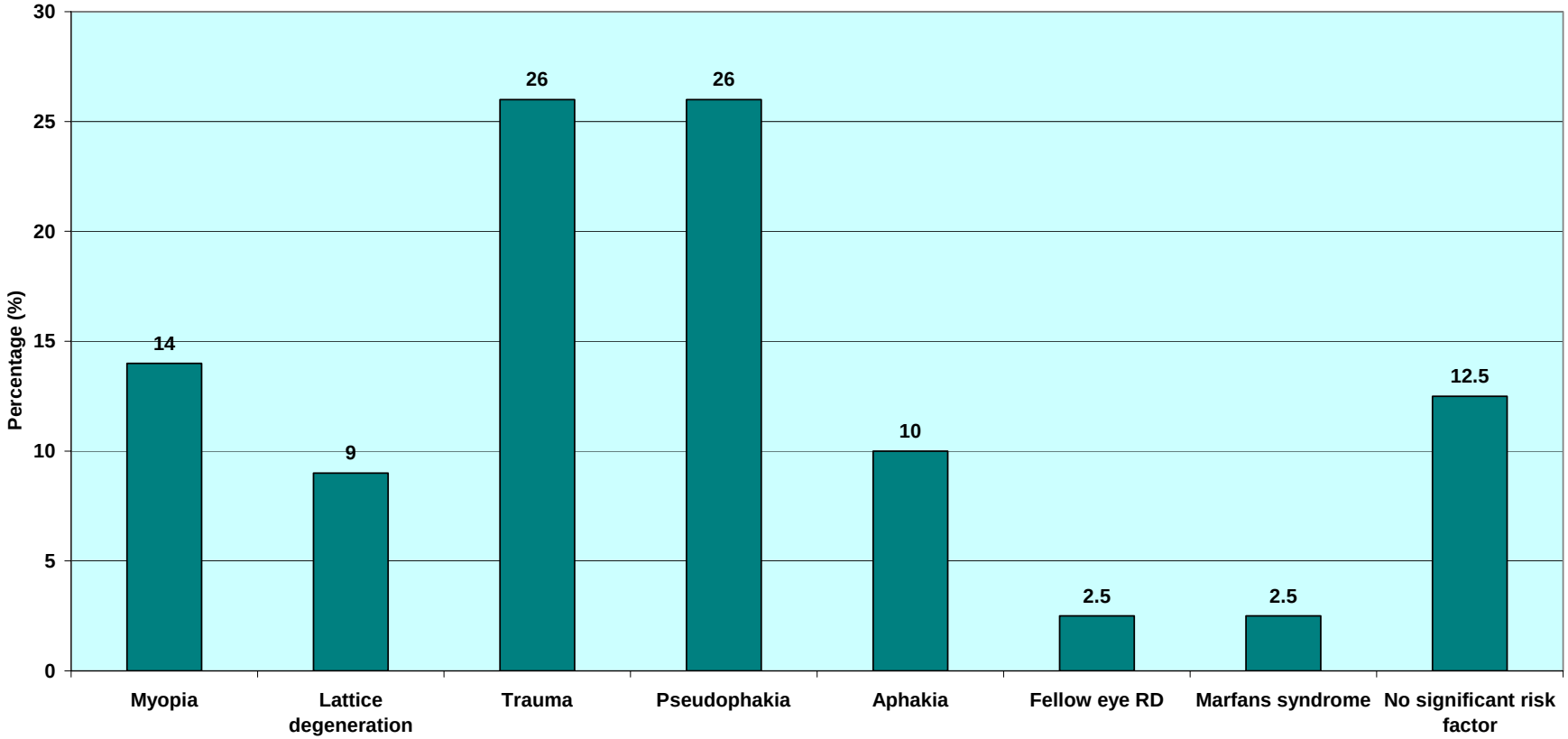
According to Schepens *et al.* 1942, 46% of cases with retinal detachment reported within 6 months following YAG capsulotomy. This corresponds well with our series where 5 out of 8 patients reported within six months.

15. Location of break in relation to risk factor

Etiological factor	ST	IT	SN	IN
Myopia	10	-	1	-
Lattice degeneration	5	2	-	-
Pseudophakia	12	3	1	1
Aphakia	2	-	2	1
Trauma	5	10	2	1
Others	1	2	-	1

Most of the cases had breaks in superotemporal quadrant, except for cases, with history of trauma that had more inferotemporal breaks which is in comparison with the study by Lefferstra *et al.* 1950 in his series of 200 patients of trauma with retinal detachment which showed inferotemporal quadrant as the commonest site for the break. In our study, aphakes had

Etiological Risk Factors



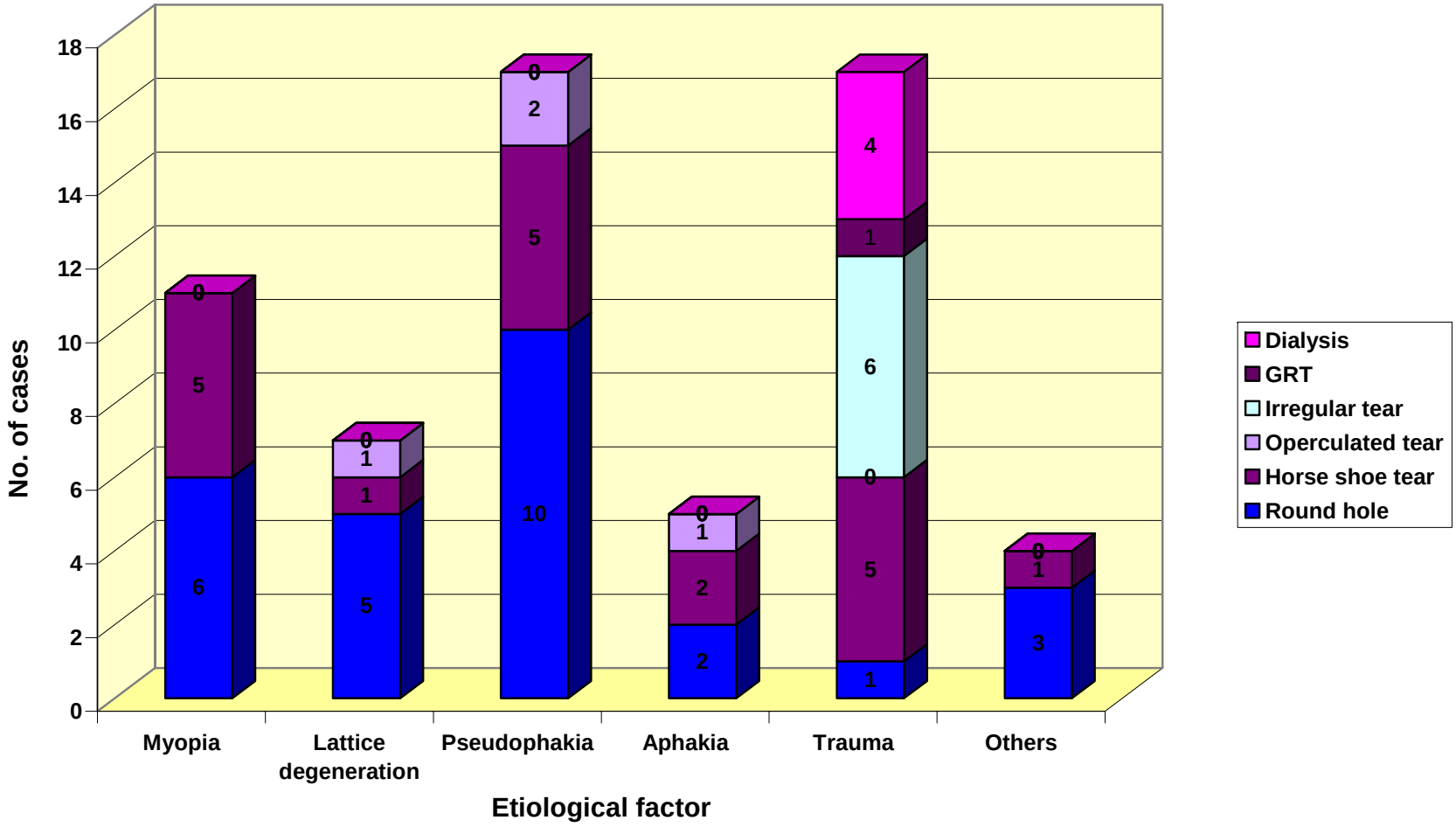
a predominance for nasal breaks which is in comparison with the study by William G. Everett *et al.* 1968 who in his series of 353 cases showed nasal breaks to be common in aphakes.

16. Type of break in relation to risk factors

Etiological factor	Round hole	Horse shoe tear	Operculated tear	Irregular tear	GRT	Dialysis
Myopia	6	5	-	-	-	-
Lattice degeneration	5	1	1	-	-	-
Pseudophakia	10	5	2	-	-	-
Aphakia	2	2	1	-	-	-
Trauma	1	5	-	6	1	4
Others	3	1	-	-	-	-

All group of patients had predominance to round hole followed by horse shoe type. Our study is in comparison with the studies of Ahuja *et al.* 1984, who showed round hole as the commonest break in the phakes followed by HST, Lattikainen *et al.* 1985, who showed round hole as the commonest break in myopia, Byer *et.al* 1999, who showed atrophic holes to be commonest in lattice, Hudson *et.al* 1965 who showed dialysis to be common in trauma.

Type of break in relation to risk factors



17. Extent of RD in relation to the location of break

Location of break	Total no. of cases	Quadrantic RD (1 or 2 quadrants)	Subtotal RD	Total RD
Superotemporal	41	15	8	18
Inferotemporal	19	9	2	8
Superonasal	6	3	-	3
Inferonasal	4	1	-	3

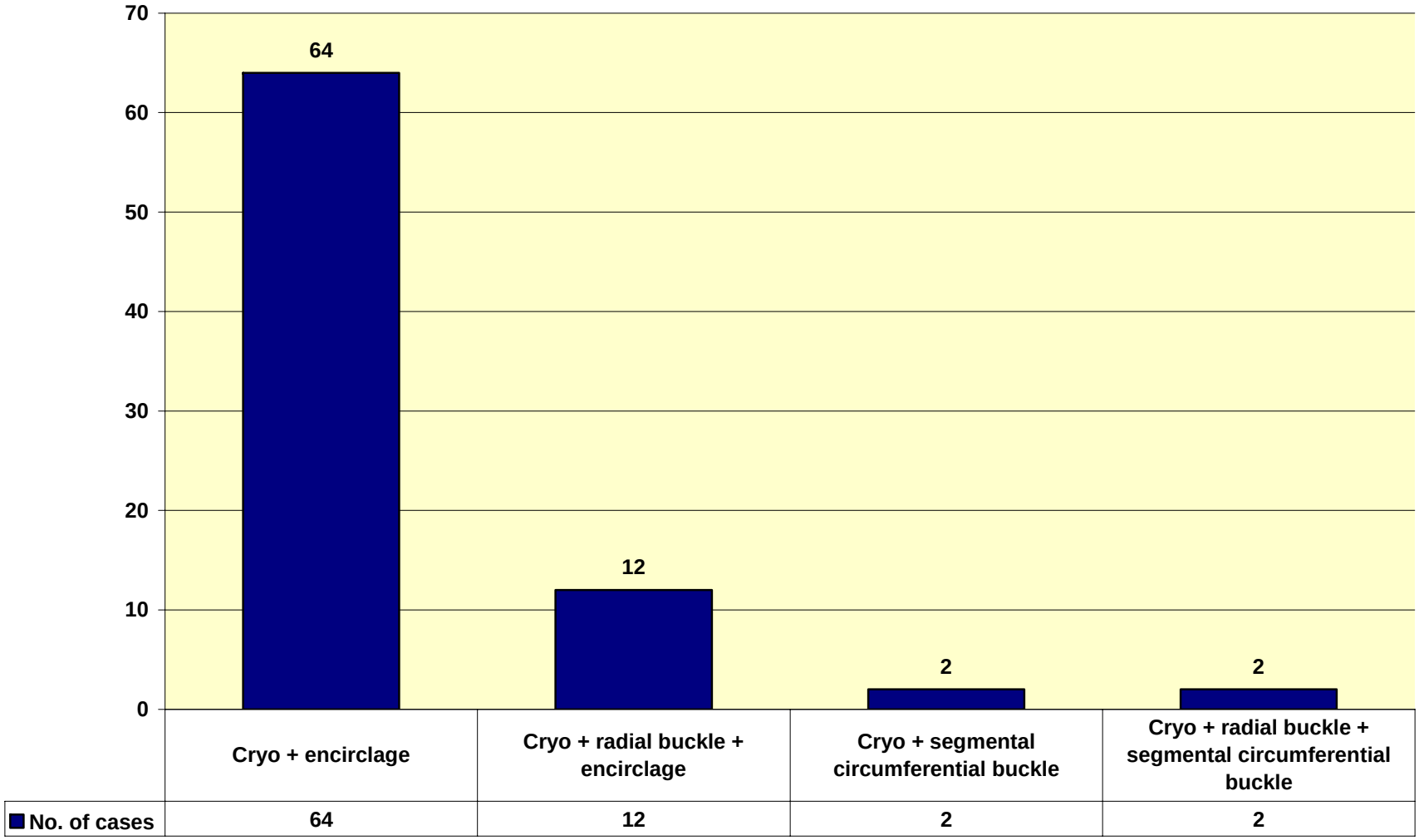
Most of the cases had either total or subtotal retinal detachment except for the inferior breaks which had a quadrantic pattern of retinal detachment. In almost all cases, the configuration of retinal detachment, obeyed the Lincoffs rule.

18. Type of surgery

Type of surgery	No. of cases	Percentage %
Cryo + encirclage	64	80
Cryo + radial buckle + encirclage	12	15
Cryo + segmental circumferential buckle	2	2.5
Cryo + radial buckle + segmental circumferential buckle	2	2.5

SRF drainage	71	88.75

Type of Surgery



Cryo was applied to all cases. Radial buckle was used in case of HST's, segmental circumferential buckle for RD's with a quadrantic extent. Encirclage was done for all myopes, aphakes, pseudophakes and total RD.

19. Anatomical reposition

Anatomical reposition	No. of cases	Percentage %
Attached	73	91
Detached	7	9

Anatomical reattachment of 91% was attained in our studies which compares with the study reported by Ranta et.al., 2002 who showed 90% reattachment rate.

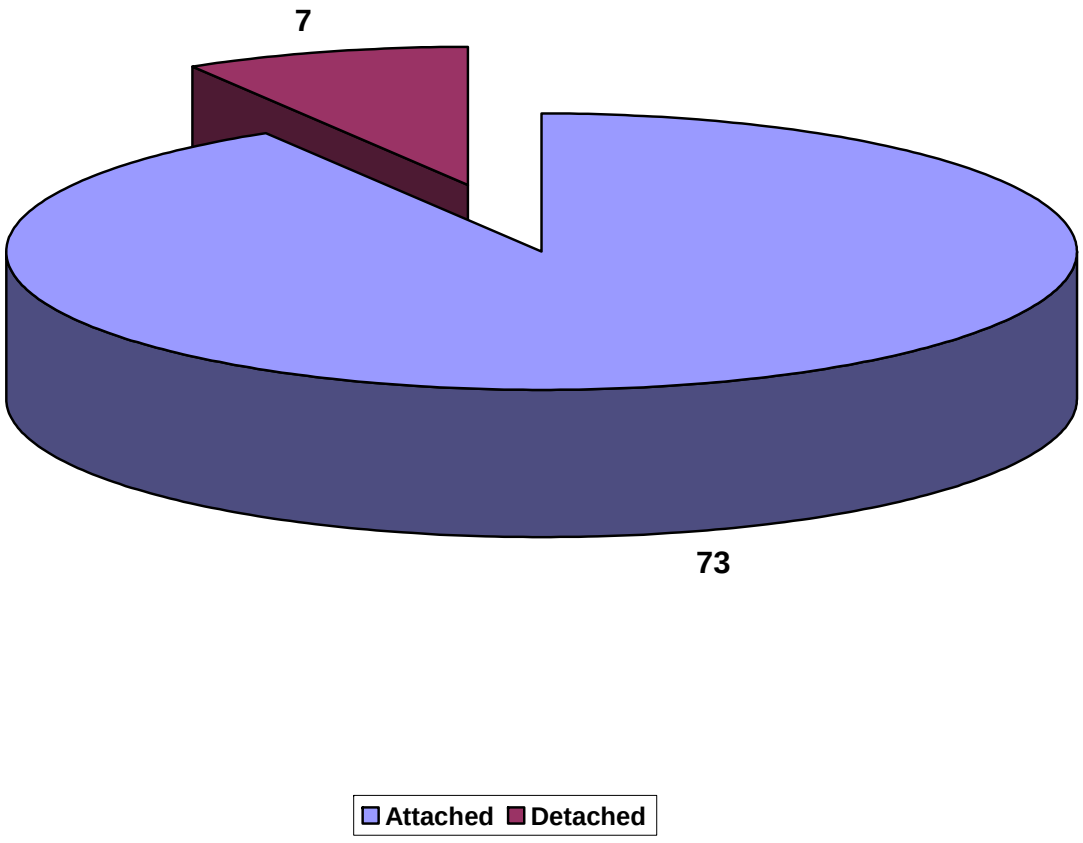
20. Cause of Anatomical failure

Cause of failure	No. of cases	Percentage %
Breaks not seen	4	57
Posterior breaks	3	43

21. Functional outcome

Post Operative VA	No. of cases	Percentage %
Better than or equal to 6/24	21	26.3
Better than or equal to 6/60	23	28.75
1/60 - 5/60	26	32.5
CFCF/HM	10	12.5

Anatomical Reposition



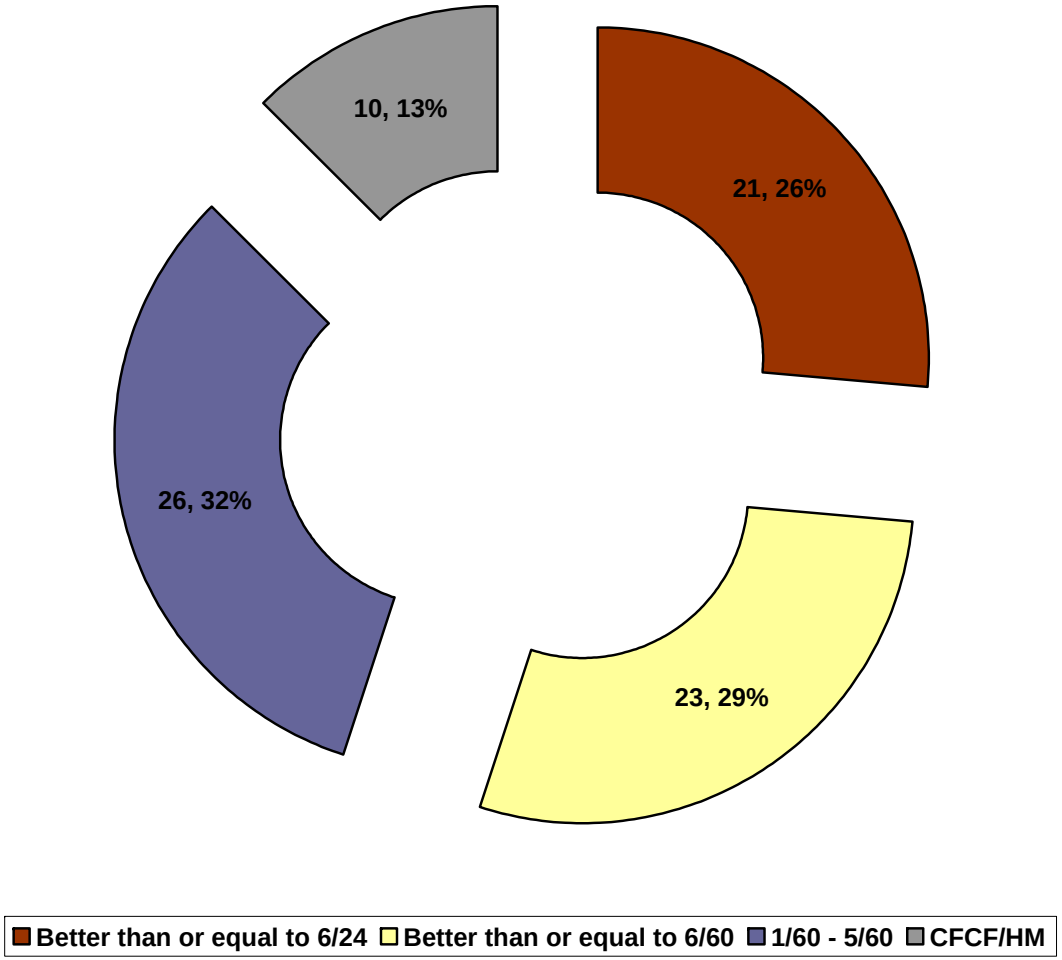
Only 12.5% of cases failed to get a usable visual status post RD surgery this stresses the need for detailed and comprehensive patient evaluation and selection for RD surgery

22. Functional outcome in relation to the duration of RD

Post Operative VA	Duration				
	> 2 weeks	**1 mth**	**2 mths**	**3-6 mths**	**6 mths – 2 yrs**
Better than or equal to 6/24	10	5	5	1	-
Better than or equal to 6/60	4	10	5	3	1
1/60 - 5/60	2	3	3	9	9
CFCF/HM	2	2	1	2	3

Out of the 21 patients with vision of more than 6/24 above, 10 patients i.e., 50% of cases presented within two weeks and the remaining 50% presented within 2 months. Patients who gained vision between 1/60 - 5/60, more than 70% presented after 3 months. This compares well with the study by Ondrejkova et.al 2004 and Zhioura et.al 2002 who in their series reported that functional outcome depended on the duration of RD and extent of RD.

Functional Outcome



23. Functional Outcome in relation to risk factors

Etiological factor	Total no. of cases	Functional Outcome				
		>6/24	>6/60	>1/60	CFCF	HM
Myopia	11	2	1	6	1	1
Lattice degeneration	7	4	2	1	-	1
Aphakia	8	1	2	4	1	-
Pseudophakia	21	4	7	7	1	-
Trauma	21	6	5	6	2	1
Others	4	1	2	1	-	-

Out of the 11 myopes 50% had vision between 1/60 - 5/60 which is mainly due to the other pathological changes in the fundus especially macular degeneration due to myopia which produced decreased vision. Out of the 8 aphakics 50% had 1/60 - 5/60, this is due to either cystoid macular edema or media opacities. Out of the 21 pseudophakes 50% had vision of more than 6/60 because they reported early to the hospital due to prior good quality of vision after surgery. Out of 21 cases of trauma, 50% had vision of more than 6/60, because they reported early to the hospital due to the mere fact that they had a ocular trauma.

24. Functional outcome in relation to the extent of RD.

Post Operative VA	Quadrantic RD	Subtotal RD	Total RD
Better than or equal to 6/24	12	2	7
Better than or equal to 6/60	8	4	11
1/60 - 5/60	7	4	15
CFCF/HM	2	2	5

Cases with vision of more than 6/60 were mostly quadrantic i.e., either one or two quadrants and those cases, with vision of 1/60 – 5/60 (70% of cases) were mostly total or subtotal RD. This result compares with the study of Zhioua et.al 2002 who in his series reported statistical significance between the extent of detachment and functional outcome and also study by Halberstadt et.al 2003 who reported that in RD's with more than 3 quadrants involvement the functional outcome is poor.

DISCUSSION

1. The 50 – 60 year age group had a maximum incidence of retinal detachment i.e., 23%
2. Males were predominantly affected
3. Right eye was more affected than the left eye
4. Phakics dominated the study i.e., 51%
5. Macular status, duration of retinal detachment dictated the visual acquity in these patients. 34% had hand movements.
6. 50% reported within one month. 35% from 1 – 6 months, and 15% reported after 6 months of onset of complaints
7. Total or near total retinal detachment was seen in 64%
8. In 90% of cases macula was detached at diagnosis
9. Single break was seen in 74% of cases
10. Break was not seen in 10% of cases
11. Round hole was seen in 44% of cases followed by horse shoe tear.
12. Round hole was the commonest hole in myopes, aphakics and pseudoaphakics and lattice degeneration.
13. Irregular tear and dialysis was seen in trauma cases
14. Most of the breaks were either equatorial or midway between equator and periphery
15. Superotemporal quadrant had highest number of breaks 59% followed by inferotemporal quadrant. Inferonasal had the lowest 6%
16. Aphakics had a preponderance to nasal breaks
17. Trauma cases had a preponderance to inferotemporal breaks

18. Myopia, lattice, Aphakia, Pseudophakia, Trauma were the known risk factors
19. Myopia and lattice together contributed 22% of cases.
20. Trauma led to retinal detachment in 26% of cases.
21. Aphakics and Pseudophakics together contribute to 36% of cases.
22. Cases with breaks in the superior quadrants had a preponderance to total retinal detachment while majority of cases with breaks in inferior quadrants had a quadrantic pattern of retinal detachment either one or two quadrants.
23. Cryopexy with encirclage and SRF was done in all cases of total/sub total retinal detachment and also in case of aphakia, pseudophakia, myopia and cases in which breaks were not found.
24. Presence of HST warranted a radial plomb for sealing in addition to either segmental buckle or encirclage depending on the extent of retinal detachment.
25. Anatomical reattachment was attained in 91% of cases.
26. Of the 7 anatomically failed cases breaks not seen in 4 cases and the remaining 3 had posterior breaks.
27. 23 patients had a visual outcome of 6/24 or better. 22 patients had 6/60 or better and 25 patients had of 1/60 -5/60. 10 patients had of HM/CECF
28. Of the 23 patients with of 6/24 or between 52% had presented to the hospital within 2 weeks and 42% with in 2 months.
29. Of the 25 patients with of 1/60 – 5/60 only 4% presented with in 2 weeks and 24% within 2 months. 69% presented to the hospital after more than 2 months of onset of symptoms.

30. Of the 23% patients who gained vision of 6/24 or better. 52% had retinal detachment in one or two quadrants.
31. Of the 25 patients who gained vision of 1/60 – 6/60, had total or sub total retinal detachment.
32. Myopia had a poor visual outcome, 6 out of 11 had 1/ 60 – 5/60, because of the coexisting change in the retina due to myopia
33. Out of the 21 trauma cases, 11 had vision of 6/36 or better because they presented early to the hospital.
34. Aphakic and pseudophakic had a moderate outcome. Out of 28 cases. 14 had a vision of more than 6/60 and 11 had a vision of 1/60 – 5/60.
35. Cases with quadrantic pattern of RD had a better visual outcome than cases with subtotal or total RD.

SUMMARY

1. In our study of 80 cases of rhegmatogenous retinal detachment, the maximum incidence was found between 50 – 60 year old male with right eye preponderance and most of them phakic.
2. Myopia, Lattice degeneration, Aphakia, Pseudophakia and Trauma were the known risk factors
3. Total or subtotal retinal detachment dominated our study and most of them had a vision of hand movements. Most of the breaks were of round hole type and the superotemporal quadrant had the most number of breaks. Aphakes had more nasal breaks and trauma cases had more inferotemporal breaks with dialysis being common in that quadrant .Irregular tear was common in trauma.
4. Breaks in the superior quadrant had either total or subtotal RD and inferior breaks had quadrantic pattern of RD.
5. Cryopexy with external tamponade was the sheet anchor in the management of our series. Though there was excellent anatomical reattachment, functional visual recovery depended on various factors like duration of retinal detachment, extent of retinal detachment and the risk factor involved.
6. Those presented early to the hospital with quadrantic pattern of retinal detachment in one or two quandrants had a better visual prognosis.
7. Myopia had a poor visual prognosis because of the associated changes in the retina. Post cataract cases had a moderate visual outcome and trauma cases had a better visual outcome because most of them reported early to the hospital.

CONCLUSION

This study recommends the recognition of risk factors, proper patient education, periodic detailed examination and early detection as valuable tools to tackle rhegmatogenous retinal detachment and the importance of screening patients with known risk factors.

So much is stressed upon the early diagnosis of glaucoma and diabetic retinopathy. But this study clearly emphasizes the importance of duration of retinal detachment in successful treatment outcome. So increased awareness about the symptoms of this condition like flashes and floaters should be provided to the general public.

All patients who come for refraction should undergo a proper indirect ophthalmoscope examination under full dilatation with special reference to myopes.

In modern cataract surgery refined techniques and instrumentation if meticulously used could greatly prevent the occurrence of posterior capsule rent. This can go a long way in preventing retinal detachment as a delayed complication in such cases. All patients who undergo cataract surgery especially those who undergo surgery in mobile eye camps in rural areas who will not be able to come to regular follow up should be made aware of the symptoms of retinal detachment at the time of final glass prescription.

The benefit of YAG capsulotomy especially in the early post operative period in any case of posterior capsular opacification should be weighed against the risk it induces in the occurrence of retinal breaks. And if it has to be done it should be preferably done after six months post operative. Any patient with ocular trauma should undergo detailed indirect ophthalmoscope examination and should be educated about the symptoms of retinal detachment and report immediately if such symptoms occur.

BIBLIOGRAPHY

Textbook

1. Retinal detachment and Allied Diseases – Charlers L.Schepenes.
2. Anatomy of the eye and orbit – Eugene Wolff.
3. Principles and Practice of Ophthalmology (Vol II) – Gholam A.Peyman.
4. Text book of the Fundus of the eye – Isaac C.Michaelson.
5. Clinical ophthalmology – Jack J.Kanshki.
6. Retinal detachment – Jack J.Kanshki (A color of manual of diagnosis & Treatment
7. Stallard's Eye surgery – Roper Hall M.J.
8. Parsons Disease of the Eye – Stephen J.H.Miller
9. Retina Vol.3 – Stephen J.Ryan, M.D.
10. System of Ophthalmology (Vol X) – Sir.Stewart Duke Elder
11. Retinal detachment – Diagnosis and Management – William Edmunds Benson
12. Current concepts in ophthalmology
13. Modern ophthalmologyVol.II.A.K.Gupta
14. Ophthalmology – Myron Yanoff & Jay S Duker.

Journals

15. Epidemiological study of nontraumatic phakic rhegmatogenous retinal detachment.
    Ivanesivic M, Bojic L, Etozovic D.
    Ophthalmic research 2000 Sep – Oct, 32(5); 237 -9
16. Observation on retinal detachment with history of trauma
    Ganguli D.P
    Indian Journal of Ophthalmology 1983, May 31(3); 184 -7
17. Retinal detachment surgery – a safe and effective approach
    Indian Journal of Ophthalmology 1986, 34; 269 – 70
18. Lattice degeneration in rhegmatogenous retinal detachment in Phakic eyes
    Indian Journal of Ophthalmology 1983, May, 31(3); 179 – 82
19. A comparative study of retinal breaks in phakia and aphakic retinal detachment.
    Ahuja O.P, Shukla M, Kumar P
    Indian Journal of Ophthalmology 1984, Jul – Aug, 32(4); 217 -9
20. The higher incidence of retinal detachment in right eye
    Merin S
    American Journal of Ophthalmology 1970, Aug, 70(2);372
21. Meridonial distribution of retinal breaks in aphakic retinal detachment
    William G. Everett
    Transaction of American Ophthalmological society 1968, 66; 196 -205
22. Data on the natural history of retinal detachment
    Schepens C.L

American Journal of Ophthalmology 1966, Feb 61(2); 213 – 26
23. Retinal tears and retinal detachment as factors affecting visual outcome after cataract extraction complicated by posterior dislocated lens material
Salam G.A, Greene J.M, Dermamo V.A.
Retina 2005, Jul – Aug, 25(5) ; 570 – 5
24. Epidemiology of retinal detachment.
Haimann V.H, Brutan T.C, Brown C.K.
Archives of Ophthalmology, 1982 Feb, 100 (2); 289 -92
25. Prophylactic treatment of fellow eye of patients with retinal detachment – a retrospective study.
Clinical and experimental ophthalmology 2004 Mar, 242(3); 191-6
26. Clinical features and surgical management of retinal detachment secondary to round retinal holes.
Ung P, Corner, Ang A.J.
Eye 2005, Jun, 19(6); 665-9
27. Characteristics of rhegmatogenous retinal detachment
Laatikainen L, Toltpanen E.M
Acta ophthalmologica 1985, Apr; 63(2), 146-54
28. Retinal detachment – A population based study in Sweden
Acta ophthalmologica 1987, Apr; 65(2), 213 -22
29. Risk of retinal detachment in patients with lattice degeneration
Sasaki K, Ideta H, Yonenota J.
Japanese journal of ophthalmology, 1988, Jul – Aug; 42(4), 308 – 13
30. The management of primary rhegmatogenous retinal detachment not involving phobia.
Eye Advanced online publication 2005, Oct
31. Juvenile rhegmatogenous retinal detachment
Nagpal M, Nagpal K, Nagpal P.N.
Indian journal of Ophthalmalogy 2004, Dec 52(4); 297 -302
32. Rhegmatogenous retinal detachment in the fellow eye phakic eye of patients with pseudophakic rhegmatogenous retinal detachment
Sharma M.C, Chan P, Kim R.E
Retina 2003, Dec 23(1); 37 -40
33. Visual outcome in primary macula of rhegmatogenous retinal detachment treated with scleral buckling
Yang C.H, Lin H.Y, Huang J.S
Journal of the formogan medical association
34. Epidemiology of retinal detachment in childhood and adolescence
Rusner M, Treister G.
Journal of paediatric ophthalmology and strabismus 1987, Jan – Feb 24(4); 42 - 4.
35. Cataract surgery as a risk factor for retinal detachment in very highly myopic eyes
Ripandelli G, Scassac, Paris V.
Ophthalmology 2003, Dec 110(12); 2355 -61
36. Prognosis of pseudophakic retinal detachment

Christensen V, Vilumsen J
Journal of cataract and refractive surgery 2005, Feb 31(2); 354 – 8

37. Rhegmatogenous retinal detachment
Ondrejkova M, Izak M
Ceska a slovenska oftalmologic 2004, Apr 60(2), 149 – 54.
38. Retinal detachment in marfans syndrome – clinical characteristic and surgical outcome.
Sharma T, Gopal L, Shanmugam M.P, Bhinde P.S, Agarwal R.
Retina 2002, Aug, 22(4); 423 -8.
39. Outcome of primary rhegmatogenous retinal detachment in myopia of >5D
Kwok A.K, Cheng L.L
Ophthalmic surgery and lasers 2002, May – Jun 33(3); 188 -94.
40. Functional and anatomic outcome of retinal detachment surgery in pseudophakia
Ranta P, Kivela T.
Ophthalmology 2002, Aug, 109(8); 1432
41. Functional results of rhegmatogenous retinal detachment and macular detachment
Zhioua R, Malek I
LaTunisie Medicale 2002, Nov 80 (11); 681 -4
42. Myopia and rhegmatogenous retinal detachment
Bonnet M
La Revue du praticien 1993, Sep, 43(14); 1779 – 83
43. Pseudophakic retinal detachment
Grevem C.M
Ophthalmology 1992, Feb, 99(2); 257 – 62
44. Factors influencing anatomic and visual results in primary scleral buckling
Ahamadieh H, Entezori M
European Journal of Ophthalmology 2000, Apr – Jun, 10(2); 153 – 9
45. Retinal detachment in relation to cataract surgery
Gray R.H, Evans A.R.
British Journal of Ophthalmology 1989, Oct, 73(10); 773
46. Long term natural history of lattice degeneration of the retina
Byer N.E
Ophthalmology 1996, 1396 – 1401.

LIST OF SURGERIES

No.	Name	Age	Sex	I.P.No.	Surgery Performed
1.	Muthu	15	M	388841	RE Chalazion I & C done
2.	Mariamma	29	F	392365	RE Pterygium Excision done
3.	Saravanan	51	M	393185	LE Dacryocystectomy done
4.	Raji	28	F	392621	LE Dacryocystorhinostomy done
5.	Suresh	21	M	387415	RE Tarsorraphy done
6.	Sridevi	31	F	8132	RE Complete Lid tear sutured
7.	Ravi	25	M	388211	LE Corneal sutured
8.	Thirumalai	41	M	390212	RE Corneoscleral tear sutured
9.	Giridhar	6	M	392215	RE Excision of limbal dermoid
10.	Varadan	62	M	394812	RE Therapeutic Keratoplasty done
11.	Venkat	65	M	393261	RE Optical Keratoplasty assisted
12.	Muniammal	70	F	388153	LE ECCE done
13.	Yetti	65	M	390515	RE ECCE & PCIOL done
14.	Kathayi	65	F	389917	RE Trabeculectomy done
15.	Rani	50	F	392578	RE SICS & PCIOL done
16.	Ratnammal	62	F	399157	RE Trab with ECCE & PCIOL done
17.	Ansarbee	67	F	397256	LE RD surgery done
18.	Gomathi	10	F	390819	RE Frontails sling surgery done
19.	Kumari	59	F	391512	LE Corneal tear suturing done
20.	Sivakumar	3	M	390129	LE Lateral rectus recession & Medical rectus resection done

"A MULTIVARIATE ANALYSIS OF FACTORS AFFECTING MANAGEMENT

OUTCOME IN RHEGMATOGENOUS RETINAL DETACHMENT.

PROFORMA CASE SHEET

NAME :	**AGE :**	**SEX :**	**IP NO.**
OCCUPATION:	**DOA:**	**DOD :**	**CASE NO:**

PRESENTING COMPLAINTS:

	RE	DUR	LE	DUR
FLASHES	YES/NO		YES/NO	
FLOATERS	YES/NO		YES/NO	
DEFECTIVE VISION	YES/NO		YES/NO	
INVERSE DIPLOPIA	YES/NO		YES/NO	
OTHERS	YES/NO		YES/NO	

PAST HISTORY:

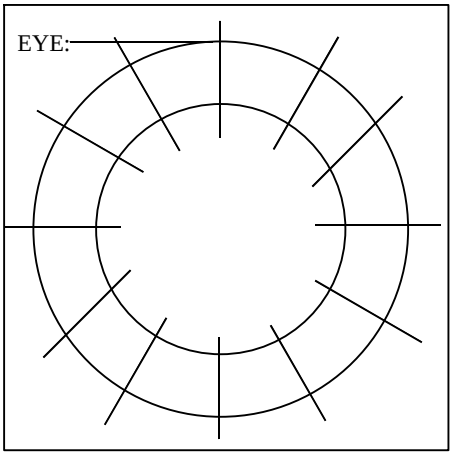
H/O TRAUMA	YES/NO	YES/NO
H/O REFRACTIVE ERROR	YES/NO	YES/NO
TYPE : MYOPE		
HYPERMETROPE		
H/O CATARCT SURGERY :	YES/NO	YES/NO
H/O YAG CAPSULOTOMY :	YES/NO	YES/NO

H/O SYSTEMIC DISEASES :

FAMILY HISTORY:

GENERAL EXAMINATION

OCULAR	RE	LE
EYE POSITION		
EOM		
PUPIL		
LENS		
FUNDUS		
DIRECT		
INDIRECT		



DESCRIPTION OF DETACHMENT

1. EXTENT
2. MACULA
3. CONTOUR
4. RETINAL BREAKS
    a. TYPE
    b. LOCATION
5. PERIPHERAL DEGENERATION
6. FELLOW EYE

INVESTIGATIONS:

1. VISUAL ACTIVITY	RE	LE
DISTANT		
NEAR		
RETINOSCOPY		
CORRECTED VA		
2. TENSION		
3. FIELDS		
4. ULTRASOUND		

TREATMENT

POST OP:

VISUAL ACUITY

MASTER CHART

Sl. No.	Name	IP Number	Age	Sex	Eye	Duration	Predisp factors	Type of break	S/M	Location	Extent of RD	Mac	Preop VA	Surgery	Result	
															Anat	Function
1	Jayashree	388731	26	F	RE	1 week	Myopia	HST	S	SN	2 Quadrant	Off	1/60	C+R+E+SRF	Attached	3/60
2	Panner Selvam	398908	44	M	LE	2 months	Trauma	GRT	S	IT	Total	Off	1/60	C+R+E+SRF	Attached	2/60
3	Shankar	398639	26	M	RE	2 weeks	Trauma	Dialysis	S	IT	Total	On	6/36	C+E	Attached	6/60
4	Kavitha	397460	20	F	RE	4 months	lattice	RH	M	IT	Total	Off	1/60	C+E+SRF	Attached	6/60
5	Gurunathan	396230	32	M	LE	2 years	Trauma	HST	S	ST	Total	Off	CFCF	C+E+SRF	Attached	3/60
6	Periyasamy	397648	65	M	RE	6 months	Pseudo phakia[Y]	RH	S	ST	Total	Off	HM	C+E+SRF	Attached	6/60
7	Eyalumalai	398317	37	M	RE	2 weeks	lattice	HST	S	ST	2 Quadrant	ON	6/60	C+E+SRF	Attached	6/12
8	Shanas Begam	396254	22	F	RE	6 months	Myopia	RH	S	ST	3 Quadrant	Off	CFCF	C+E+SRF	Attached	6/24
9	Dinakaran	396050	16	M	RE	1 week	Trauma	HST	S	ST	2 Quadrant	Off	2/60	C+CP+SRF	Attached	6/12
10	Damodharan	397044	60	M	RE	2 months	-	RH	S	IT	2 Quadrant	ON	6/9	C+CP	Attached	6/12
11	Madhan	393031	13	M	RE	1 week	Trauma	IRT	S	SN	1 Quadrant	On	6/6	C+E+SRF	Attached	6/9
12	Ansar Bee*	397256	65	F	RE	2 weeks	Aphakia	-	-	-	Total	Off	HM	C+E	Attached	6/24
13	Kanni Ammal	395011	51	F	LE	1 month	Trauma	IRT	S	IT	2 Quadrant	Off	4/60	C+E	Attached	6/12
14	Yesodha	397301	41	F	RE	2 months	Pseudo phakia	RH	M	ST	3 Quadrant	Off	HM	C+E+SRF	Attached	6/24
15	Ayyan Durai	396056	16	M	RE	3 months	Myopia	RH	S	ST	2 Quadrant	Off	HM	C+E+SRF	Attached	4/60

															Result	
16	Radhakrishnan	390258	56	M	LE	2 months	Pseudo phakia	HST	S	ST	Total	Off	PL	C+R+E+SRF	Attached	3/60
17	Rajamanikam	394507	51	M	RE	1 month	Pseudo phakia	HST	M	ST	3 Quadrant	Off	1/60	C+R+E+SRF	Attached	6/60
18	Obul Reddy	392660	65	M	RE	1 year	Aphakia	-	-	-	Total	Off	CFCF	C+E+SRF	Attached	1/60
19	Siva subramanian	392686	62	M	RE	2 years	Pseudo phakia[Y]	-	-	-	Total	Off	CFCF	C+E+SRF	NA	CFCF
20	Dhanalakshmi	395135	50	F	LE	1 week	Pseudo phakia	HST	S	ST	Total	Off	HM	C+E+SRF	Attached	6/60
21	Jerry Mary	395397	51	F	RE	1 week	lattice	RH	S	ST	Total	ON	6/36	C+E+SRF	Attached	6/12
22	Ramu	388815	51	M	RE	2 weeks	Pseudo phakia	HST	M	IT	Total	Off	HM	C+R+E+SRF	Attached	6/12
23	Nethaji	392908	8	M	RE	1 week	Trauma	IRT	S	IT	1 Quadrant	Off	CFCF	C+E+SRF	Attached	6/9
24	Sasindran	389628	51	M	LE	8 months	lattice	RH	M	ST	Total	Off	HM	C+E+SRF	Attached	6/60
25	Varathan	388963	53	M	LE	1 week	Pseudo phakia[Y]	RH	S	ST	1 Quadrant	Off	PL	C+E+SRF	Attached	6/24
26	Suresh	388863	15	M	LE	1 month	Trauma	Dialysis	S	IT	Total	Off	HM	C+E+SRF	Attached	3/60
27	Manohar	389025	49	M	RE	1 month	-	OT	S	ST	1 Quadrant	Off	PL	C+E+SRF	Attached	6/18
28	Lathif Nisha	388068	60	F	RE	2 months	Pseudo phakia	RH	S	SN	Total	Off	PL	C+E+SRF	Attached	5/60
29	Annamalai	398818	42	M	LE	1 year	Aphakia	OT	S	IN	Total	Off	HM	C+R+E+SRF	Attached	1/60
30	Thanam	387431	65	F	LE	2 months	-	RH	S	ST	Total	Off	CFCF	C+E+SRF	Attached	6/12
31	Uma Rani	387360	30	F	LE	1 year	Myopia	RH	M	ST	Total	Off	HM	C+R+E	Attached	HM

															Result	
32	Arumugam	387407	55	M	RE	1 month	Pseudo phakia	RH	M	IN	Total	Off	PL	C+E+SRF	Attached	6/60
33	Abdul Rehman	387807	30	M	RE	4 months	Myopia	HST	S	ST	3 Quadrant	Off	PL	C+R+E+SRF	Attached	4/60
34	Parthsarathy	388070	17	M	LE	1 month	Aphakia	RH	M	ST	Total	Off	HM	C+E+SRF	Attached	6/36
35	Sharath babu	388289	21	M	RE	1 month	Marfans	HST	S	IT	Total	Off	1/60	C+E+SRF	Attached	6/60
36	Kanagamal	388114	45	F	RE	3 weeks	Pseudo phakia	RH	S	ST	2 Quadrant	Off	1/60	C+R+E+SRF	Attached	6/60
37	Chandra	388398	60	F	LE	2 months	Aphakia	HST	S	ST	3 Quadrant	Off	HM	C+E+SRF	Attached	6/36
38	Sivakumar	388300	37	M	LE	1 month	Trauma	IRT	S	IT	1 Quadrant	Off	HM	C+E	Attached	6/36
39	Ramalingam	390268	52	M	RE	6 months	Pseudo phakia	RH	S	ST	3 Quadrant	Off	CFCF	C+E+SRF	Attached	4/60
40	Ramani	390258	59	M	LE	1 month	-	HST	S	IT	2 Quadrant	Off	2/60	C+E+SRF	Attached	6/36
41	Radhakrishnan	390278	55	M	LE	1 month	-	HST	S	ST	Total	Off	PL	C+R+E+SRF	Attached	6/60
42	INDRA	390086	35	F	LE	1 month	Trauma	-	-	-	3 Quadrant	Off	CFCF	C+E+SRF	Attached	5/60
43	Raguram	391333	12	M	RE	2 weeks	Trauma	-	-	-	1 Quadrant	Off	PL	C+E+SRF	NA	HM
44	Ayyappan	391873	29	M	LE	2 months	Marfans	RH	S	IN	2 Quadrant	Off	3/60	C+E+SRF	Attached	6/24
45	Balamal	392817	50	F	LE	1 month	-	OT	S	ST	2 Quadrant	Off	HM	C+E+SRF	Attached	CFCF
46	Shanthi	392091	51	F	RE	1 year	Myopia	HST	M	ST	Total	Off	HM	C+E+SRF	Attached	3/60
47	Faridha babu	392569	29	F	RE	3 months	Myopia	HST	S	ST	2 Quadrant	Off	1/60	C+R+CP	Attached	4/60

															Result	
48	Gopal	392278	80	M	RE	1 year	Aphakia	-	-	-	Total	Off	PL	C+E+SRF	Attached	3/60
49	Valli ammal	391549	60	F	RE	1 month	Pseudo phakia[Y]	RH	S	ST	Total	Off	PL	C+E+SRF	Attached	6/24
50	Amaravathi	391430	45	F	LE	3 months	-	RH	S	ST	3 Quadrant	Off	CFCF	C+E+SRF	Attached	6/60
51	Ravi	391553	38	M	RE	2 months	Trauma	-	-	-	Total	Off	HM	C+E+SRF	Attached	6/36
52	Balu	392954	35	M	RE	2 months	Trauma	HST	S	ST	Total	Off	1/60	C+E+SRF	Attached	CFCF
53	Tiruammal	390607	30	F	LE	6 months	Trauma	IRT	S	ST	2 Quadrant	Off	PL	C+E+SRF	Attached	5/60
54	Munusami	390045	69	M	RE	3 weeks	Pseudo phakia[Y]	RH	S	IT	2 Quadrant	Off	1/60	C+E+SRF	Attached	6/60
55	Prabu	388584	21	M	LE	1 month	lattice	RH	S	ST	2 Quadrant	Off	6/60	C+E+SRF	Attached	6/24
56	Jyothilingam	381722	19	M	LE	2 weeks	Myopia	HST	S	ST	Total	TH	6/24	C+E+SRF	Attached	6/18
57	Ganasundari	391002	50	F	RE	2 years	Pseudo phakia[Y]	-	-	-	Total	Off	PL	C+E+SRF	Attached	2/60
58	Shankar	398639	26	M	RE	2 weeks	Trauma	RH	S	IT	2 Quadrant	TH	6/36	C+E	Attached	6/24
59	Panner selvam	398908	44	M	LE	2 months	Trauma	Dialysis	S	IN	Total	Off	CFCF	C+R+E+SRF	Attached	6/60
60	Jaya	396771	60	F	RE	2 weeks	Pseudo phakia	HST	M	ST	Total	Off	HM	C+E+SRF	NA	CFCF
61	Syed Munnar	396906	51	M	RE	2 weeks	Pseudo phakia	OT	S	IT	3 Quadrant	Off	HM	C+E+SRF	Attached	6/36
62	Swami kannu	396847	66	M	RE	6 months	Pseudo phakia[Y]	RH	M	ST	2 Quadrant	Off	HM	C+E+SRF	Attached	5/60
63	Banumathi	397852	38	F	LE	1 month	Fellow eye RD	RH	S	ST	Total	Off	1/60	C+E+SRF	Attached	4/60

															Result	
64	Guruammal	398087	55	F	LE	6 months	Pseudo phakia[Y]	-	-	-	Total	Off	CFCF	C+E+SRF	Attached	5/60
65	Pandiyan	388140	31	M	RE	1 week	Fellow eye RD	RH	S	IT	1 Quadrant	Off	HM	C+R+E+SRF	Attached	6/60
66	Govindan naidu	398947	64	M	RE	3 months	Pseudo phakia	-	-	-	3 Quadrant	Off	1/60	C+E+SRF	NA	CFCF
67	Munian	389031	15	M	LE	2 months	Trauma	MH	S	IT	Total	Off	HM	C+E+SRF	Attached	6/24
68	Sudha	391549	21	F	RE	1 year	Myopia	RH	S	ST	Total	Off	PL	C+E+SRF	NA	CFCF
69	Durairaj	391553	18	M	RE	1 month	Trauma	IRT	M	IT	3 Quadrant	Off	HM	C+E+SRF	NA	CFCF
70	Santhammal	391932	59	F	RE	1 year	Aphakia	HST	S	SN	Total	Off	PL	C+E+SRF	Attached	2/60
71	Balammal	392817	50	F	LE	3 months	lattice	RH	S	IT	2 Quadrant	Off	HM	C+E+SRF	Attached	1/60
72	Kamalamoorthy	392362	16	M	RE	1 year	Trauma	HST	S	ST	Total	Off	HM	C+E+SRF	Attached	1/60
73	Balaguru	392855	35	M	RE	2 months	Myopia	RH	S	ST	1 Quadrant	Off	HM	C+E+SRF	Attached	6/36
74	Tirupathiammal	394535	30	F	LE	6 months	Myopia	RH	M	ST	1 Quadrant	Off	PL	C+E+SRF	Attached	5/60
75	Arun prakash	394047	13	M	LE	1 week	Trauma	Dialysis	S	IT	Total	Off	2/60	C+E+SRF	Attached	5/60
76	Karupusamy	388020	M	F	LE	1 month	lattice	RH	S	ST	2 Quadrant	Off	HM	C+E+SRF	Attached	6/24
77	Verrapan	396355	43	M	RE	1 month	-	HST	S	ST	2 Quadrant	Off	1/60	C+R+CP	Attached	6/36
78	Perumal	394412	70	M	LE	2 years	Pseudo phakia	OT	S	ST	3 Quadrant	Off	HM	C+E+SRF	Attached	1/60
79	Puroshathaman	394536	15	M	RE	2 months	Trauma	HST	S	SN	2 Quadrant	Off	2/60	C+E+SRF	Attached	6/36

															Result	
80	Salima begam	395244	74	F	RE	6 months	Aphakia	RH	S	SN	Total	Off	PL	C+E+SRF	NA	CFCF

KEY TO MASTER CHART

M	- Male
F	- Female
RE	- Right eye
LE	- Left eye
Y	- Yag Capsulotomy
S	- Single
M	- Multiple Break
HST	- Horse shoe tear
RH	- Round Hole
MH	- Macular Hole
D	- Dialysis
GRT	- Giant retinal tear
OT	- Operculated tear
IRT	- Irregular retinal type
ST	- Superotemporal
SN	- Superonasal
IT	- Inferotemporal
IN	- Inferonasal
SE	- Segmental Encirclage
TH	- Threatened
C+E	- Cryo + Encirlage
R	- Radial Plomb
CP	- Circumferential Plomb
NA	- Not attached
SRF	- SRF drainage
HM	- Hand movements
CFCF	- Counting fingers close to face
NS	- Not Seen

ABBREVIATIONS

RD	- Retinal detachment
S/L	- Slit lamp
SRF	- Sub retinal fluid
CR	- Choria retinal
CRA	- Central retinal artery
MPS	- Mucopolysaccharide
VR	- Vitreoretinal
RPE	- Retinal Pigment Epithelium
WWP	- White with pressure
YAG	- Yittrium Aluminium Garnet
PCO	- Posterior Capsular Opacification
PRD	- Pseudophakic Retinal Detachment